

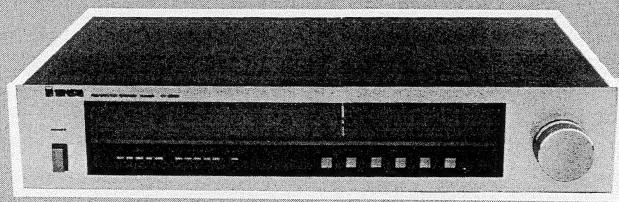
Service Manual

MODEL TT3245/TP2200/TM2250

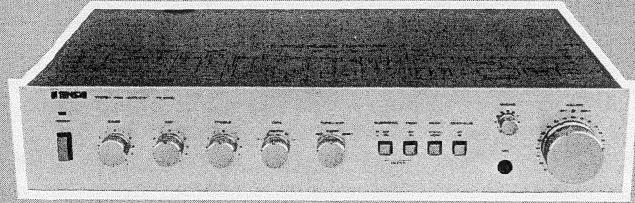
TUNER/PRE-AMPLIFIER/POWER AMPLIFIER



STEREO TUNER TT3245



STEREO PRE-AMPLIFIER TP2200



STEREO POWER AMPLIFIER TM2250



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Specifications are subjects to change without notice.

MODEL TT3245

1. SPECIFICATIONS

FM PERFORMANCE

Frequency Range	88 – 108 MHz
IHF Sensitivity at 98 MHz	1.9µV
Image Rejection at 106 MHz	50 dB
IF Rejection at 90 MHz	95 dB
Spurious Response at 98 MHz	80 dB
Bandwidth 1.0% THD, 1100µV at 98 MHz, 75 kHz dev.	
Wide Position	250 kHz
Narrow Position	200 kHz
S/N at 1100µV, at 98 MHz	70 dB
Fidelity ±1 dB, 1100µV at 98 MHz	20 – 15,000 Hz
Output Level at 1100µV 98 MHz,	
75 kHz dev. (Fixed)	1V
Selectivity 100µV, ±300 kHz	
Wide Position	40 dB
Narrow Position	55 dB
Muting Level	20µV
Stereo Separation at 1100µV 98 MHz	
100 Hz	40 dB
1,000 Hz	40 dB
10,000 Hz	35 dB
Stereo THD, 1100µV at 98 MHz	
100 Hz	0.3%
1,000 Hz	0.3%
10,000 Hz	4.0%

AM PERFORMANCE

Frequency Range	
MW	531 – 1620 kHz

LW	150 – 350 kHz
Sensitivity for 20 dB S/N	
MW at 1000 kHz	500µV/m
LW at 240 kHz	600µV/m
Image Rejection	
MW at 1400 kHz	40 dB
LW at 320 kHz	40 dB
IF Rejection	
MW at 600 kHz	32 dB
LW at 320 kHz	28 dB
Spurious Response at 1000 kHz	50 dB
Bandwidth at 1000 kHz	
–6 dB	7 kHz
–40 dB	22 kHz
ACA ±10 kHz at 1400 kHz	35 dB
AGC at 100 mV/m, 1000 kHz	50 dB
S/N	
MW at 1000 kHz, 5 mV/m	40 dB
LW at 240 kHz, 10 mV/m	40 dB
Fidelity –6 dB at 5 mV/m	30 – 2,500 Hz
Output Level at 5 mV/m 1000 kHz,	
80% Modulation	1.3V
GENERAL	
Power Source	AC 220 to 240 Volts 50 Hz ~
Dimensions	430(W) x 80(H) x 250(D) mm
Weight	5 kg

2. DISASSEMBLY INSTRUCTIONS

(1) Top cover removal

Remove four screws on both sides of the set and lift up the top cover.

(2) Bottom cover removal

Remove two screws around the center of the bottom cover lift up the cover.

(3) Front panel removal

Remove a tuning knob.

Remove five screws (A) from top and bottom as shown in Figure 1 and 2, and the front panel can be removed with push buttons.

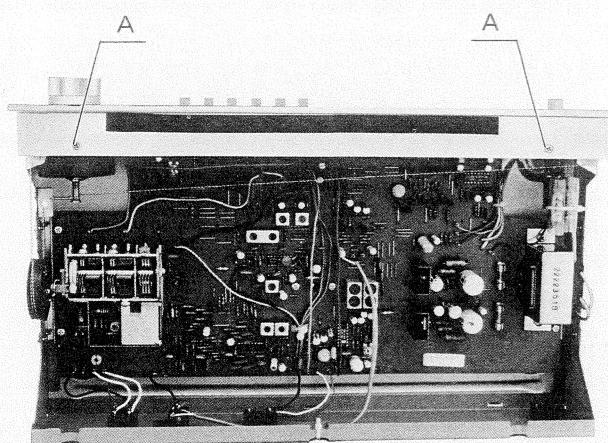


Figure 1

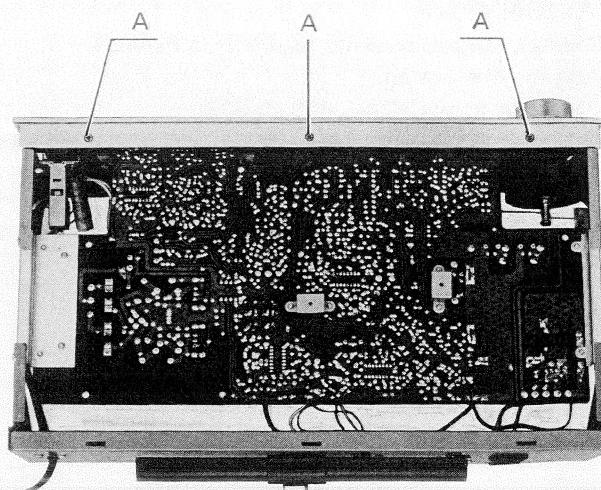


Figure 2

3. DIAL CORD STRINGING

- (1) Set the tuning capacitor to the maximum capacitance (fully counterclockwise position).
- (2) Wind the dial cord in the numerical sequence as shown in Figure 3.

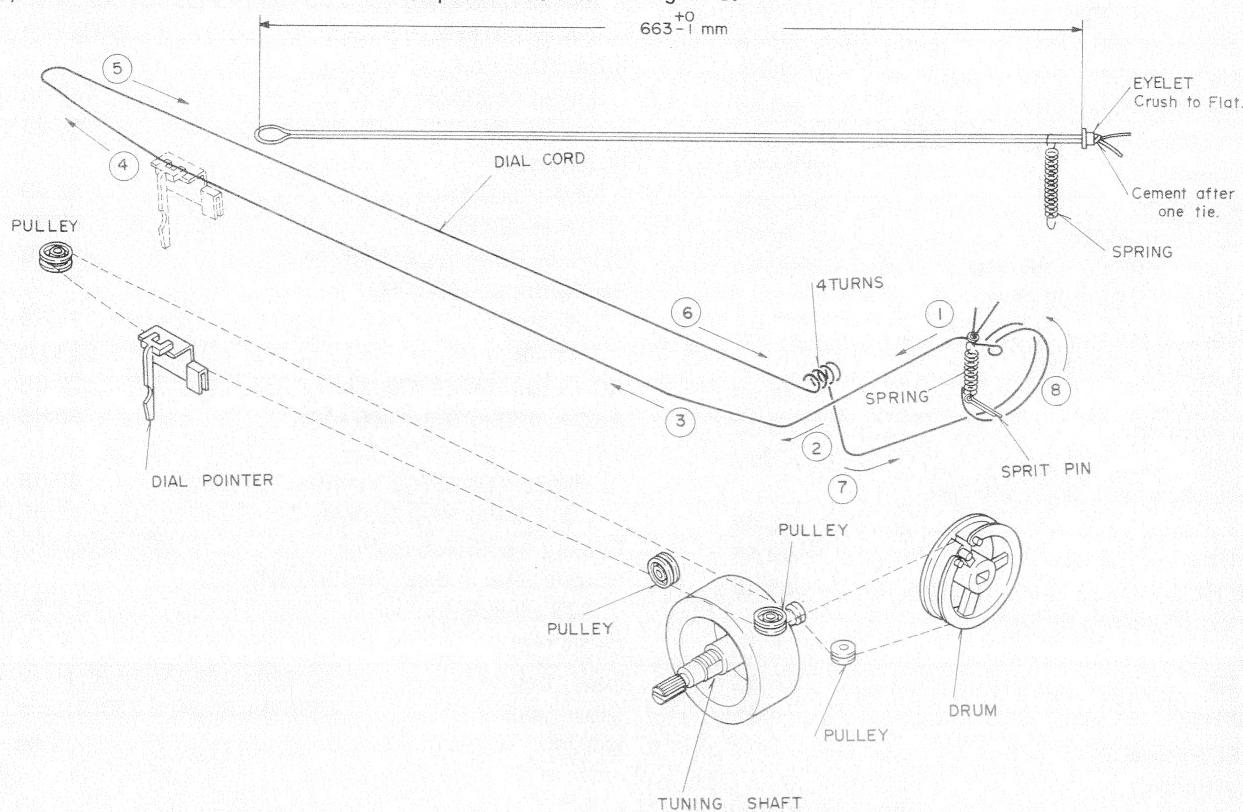


Figure 3

4. ALIGNMENT INSTRUCTIONS AM ALIGNMENT

TEST EQUIPMENTS

- (1) Signal generator with a frequency range of at least from 145 kHz to 2.6 MHz for AM.
- (2) VTM.
- (3) Test loop.

NOTES:

- (1) During alignment, keep the signal generator output at the lowest level where the set is sensible of signal.
- (2) Ground connection of signal generator ... to chassis ground.
- (3) "Tuning gang fully clockwise" means minimum capacitance position.

MW ALIGNMENT

- (1) Connect test equipments as shown in Figure 4.
- (2) Push the MW button.
- (3) Generator modulation ... 400 Hz 30%.
- (4) Proceed as outlined in the TABLE 1. MW ALIGNMENT CHART.

TABLE 1. MW ALIGNMENT CHART (For alignment points, see Figure 5.)

Item	Step	Signal Generator Frequency	Dial Setting	Meter Connection	Adjusting Point	Adjusting Level
IF	1	455 kHz	Tuning gang fully clockwise	Output terminal L ch or R ch	IFT203 IFT204	Adjust for maximum

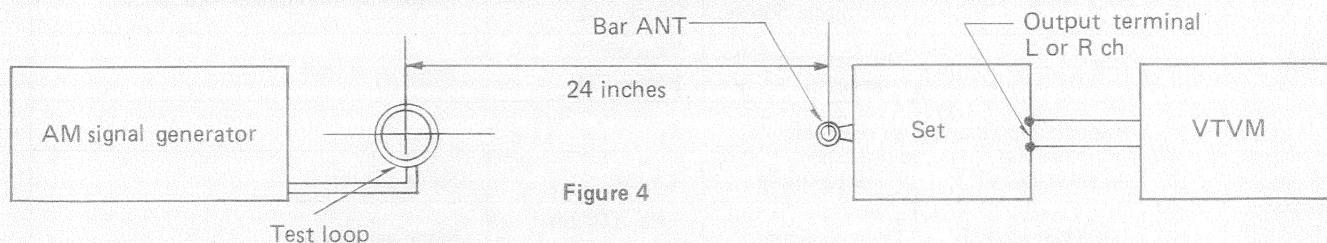
Osc. Freq.	2	510 kHz	Tuning gang fully counter- clockwise	Same as step 1	L103	Same as step 1
	3	1650 kHz	Tuning gang fully clockwise	Same as step 1	TC103	Same as step 1
	4	Repeat steps 2 and 3 as required.				
RF Track- ing	5	600 kHz	Tune to signal	Same as step 1	L102-a (MW)	Same as step 1
	6	1400 kHz	Tune to signal	Same as step 1	TC101	Same as step 1
	7	Repeat steps 5 and 6 as required.				

LW ALIGNMENT

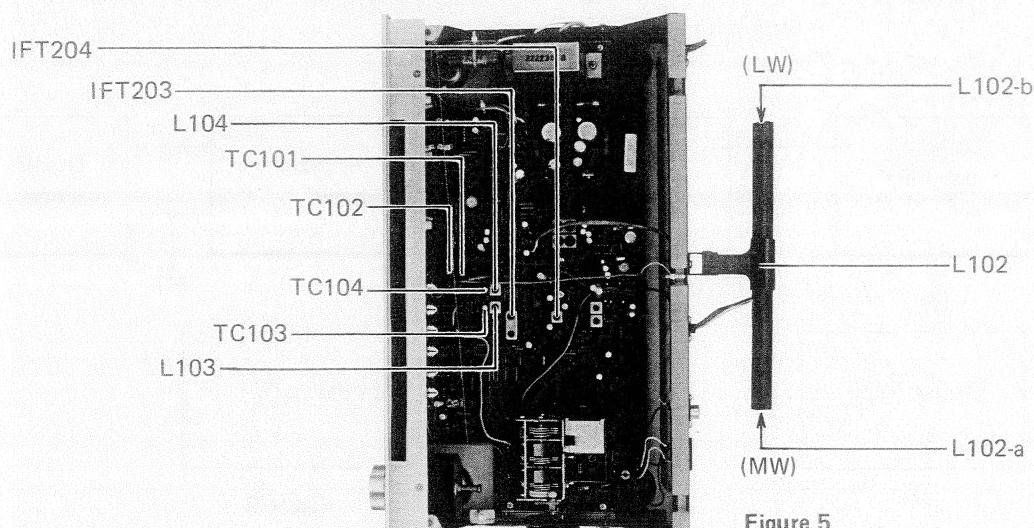
- (1) Connect test equipments as shown in Figure 4. (3) Generator modulation ... 400 Hz 30%.
 (2) Push the LW button. (4) Proceed as outlined in the TABLE 2. LW ALIGNMENT CHART.

TABLE 2. LW ALIGNMENT CHART (For alignment points, see Figure 5.)

Item	Step	Signal Generator Frequency	Dial Setting	Meter or Connection	Adjusting Point	Adjusting Level
Osc. Freq.	1	145 kHz	Tuning gang fully counter- clockwise	Output terminal L ch or R ch	L104	Adjust for maximum.
	2	370 kHz	Tuning gang fully clockwise	Same as step 1	TC104	Same as step 1.
	3	Repeat steps 1 and 2 as required.				
RF Track- ing	4	170 kHz	Tune to signal	Same as step 1	L102-b (LW)	Same as step 1.
	5	340 kHz	Tune to signal	Same as step 1	TC102	Same as step 1.
	6	Repeat steps 4 and 5 as required.				



ALIGNMENT POINTS



FM ALIGNMENT

TEST EQUIPMENTS

- (1) Signal generator with a frequency range of at least 85 MHz to 150 MHz (FM).
- (2) Distortion meter.
- (3) Oscilloscope.
- (4) VTVM.
- (5) Center meter.
- (6) FM dummy antenna (300 ohm).

ALIGNMENT

- (1) Connect test equipments as shown in Figure 6.
- (2) Push the FM button.
- (3) Set the MUTING switch to OFF (—).
- (4) Generator modulation .. 1 kHz (75 kHz dev.)
- (5) Proceed as outlined in the TABLE 3. FM ALIGNMENT CHART.

TABLE 3. FM ALIGNMENT CHART (For alignment points, see Figure 9.)

Item	Step	Signal Generator	Dial Setting	Adjusting Point	Adjusting Level
IF	1	No signal output	_____	IFT201	Center on the center meter
	2	98 MHz (1mV)	Tune to signal	IFT202	Adjust for minimum distortion
	3	Repeat steps 1 and 2 as required.			
Tuning Ind.	4	98 MHz (1mV)	Tune to signal	SVR401	Adjust for $-100\text{mV} \pm 20\text{mV}$ on VTVM (DC)
Rec. Level	5	98 MHz (1mV)	Tune to signal	SVR203	Adjust the indication on VTVM (AC) when REC LEVEL switch is "ON", should be a half level (-6dB) compared with indication when REC LEVEL switch is "OFF".
Osc. Freq.	6	87.2 MHz (10 μV)	Tuning gang fully counterclockwise	Lo on Block-FM	Adjust for maximum indication.
	7	108.4 MHz (10 μV)	Tuning gang fully clockwise	TCo on Block-FM	Same as step 6
	8	Repeat steps 6 and 7 as required			
RF Tracking	9	90 MHz (2 μV)	Tune to signal	La, Lr	Same as step 6
	10	106 MHz (2 μV)	Tune to signal	TCa, TCr on Block-FM	Same as step 6
	11	Repeat steps 9 and 10 as required.			

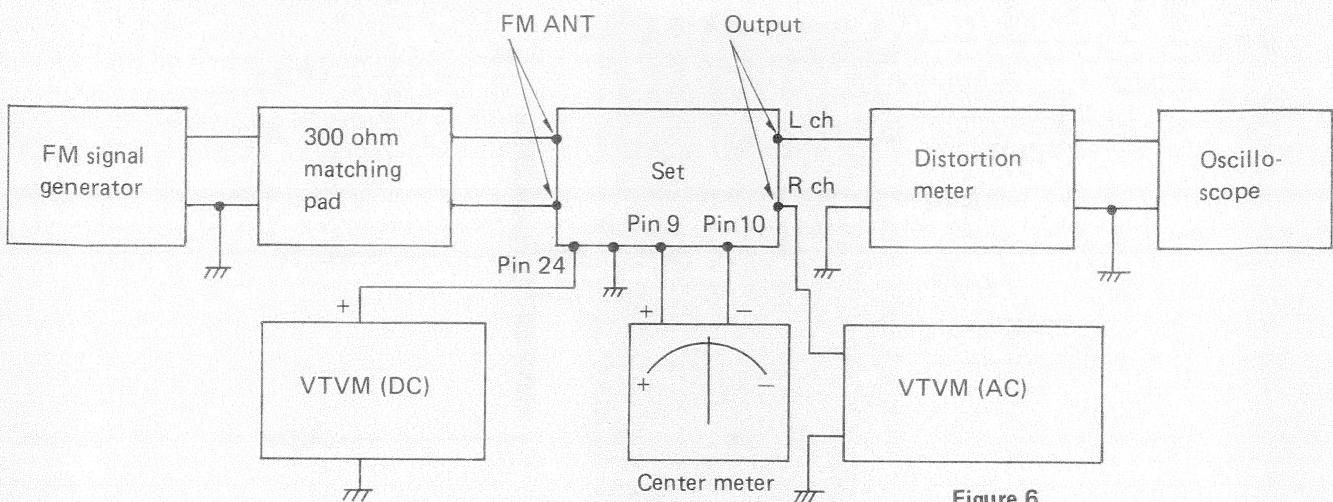


Figure 6

FM STEREO ALIGNMENT

TEST EQUIPMENTS

- | | |
|-------------------------|-----------------------|
| (1) FM signal generator | (4) Oscilloscope |
| (2) FM stereo modulator | (5) Frequency counter |
| (3) VTVM | (6) FM matching pad |

NOTE:

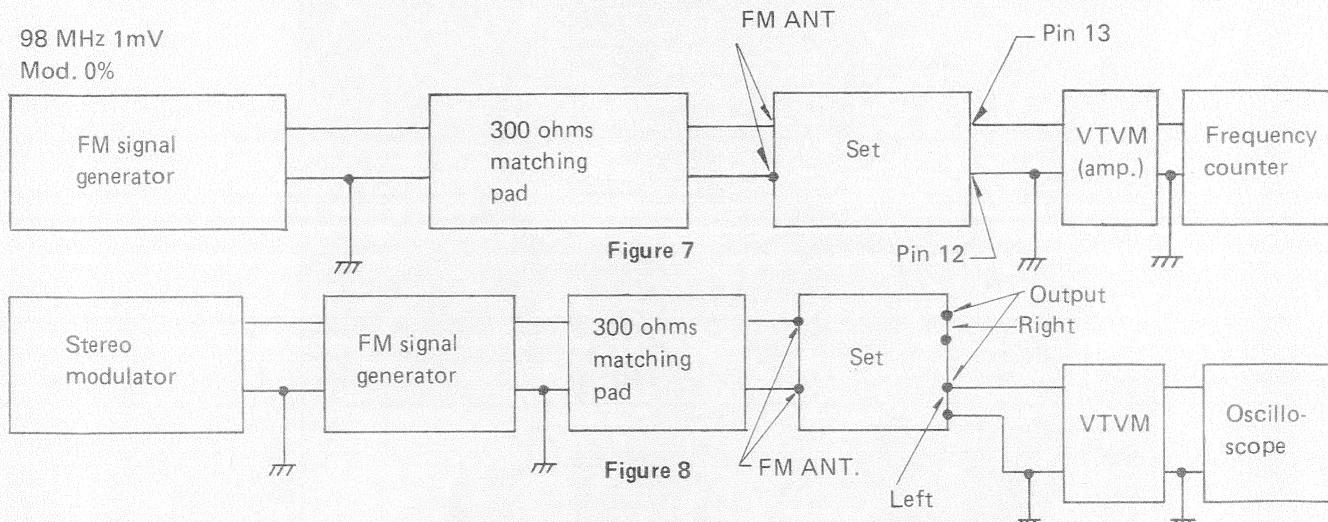
- (1) Set the deviation meter by the signal of L = R and switch mode desired.

ALIGNMENT

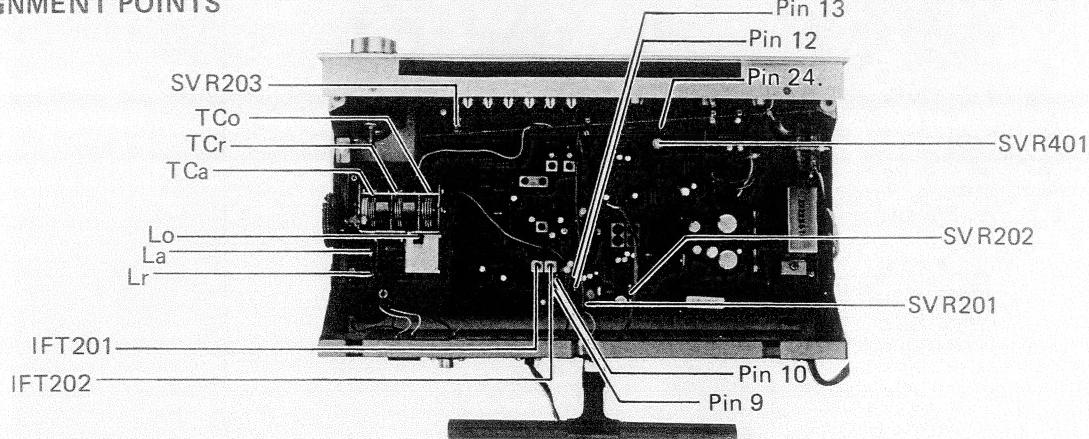
- (1) Connect the equipments as shown in Figure 7 or Figure 8.
- (2) Set the MUTING switch to ON (■).
- (3) RF signal input should be about 60 dB (1mV).
- (4) Set the turning gang to a quiet point on dial.
- (5) Proceed as outlined in the TABLE 4. FM STEREO ALIGNMENT CHART.

TABLE 4. FM STEREO ALIGNMENT CHART (For alignment points, see Figure 9.)

Item	Step	Modulation Frequency	Modulation Mode Setting	Modulation Level Setting	Adjusting Point	Adjusting Level etc.	Connection
VCO Adj.	1	—	—	0%	SVR201 slightly	76.0 ± 0.076 kHz	Figure 7
Sep. Adj.	2	1000 Hz	Stereo Rch with pilot	90% (Main & Sub) (67.5 kHz dev.) 10% (Pilot) (7.5 kHz dev.)	SVR202 (slightly separation)	Adjust for minimum.	Figure 8

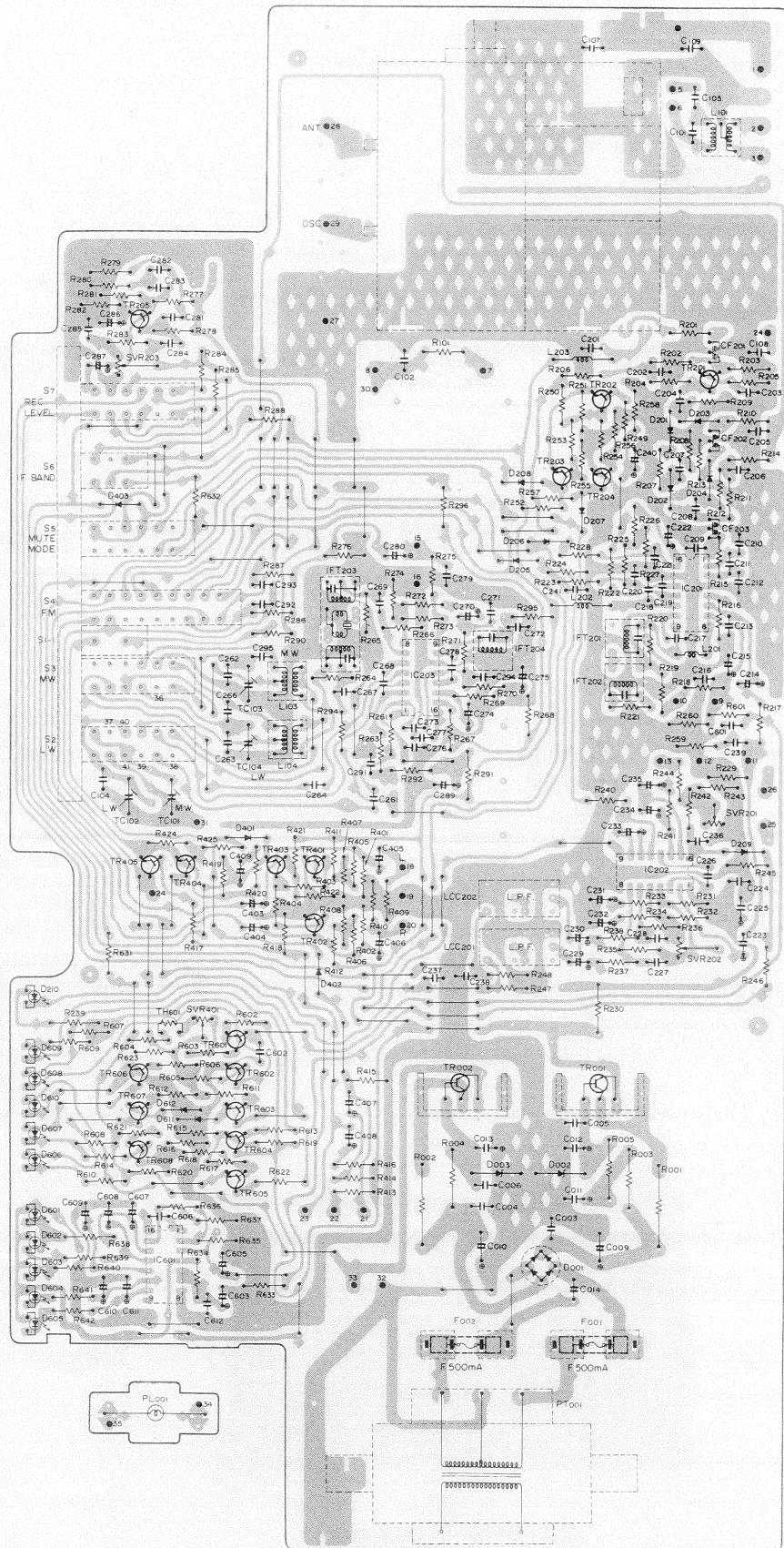


ALIGNMENT POINTS

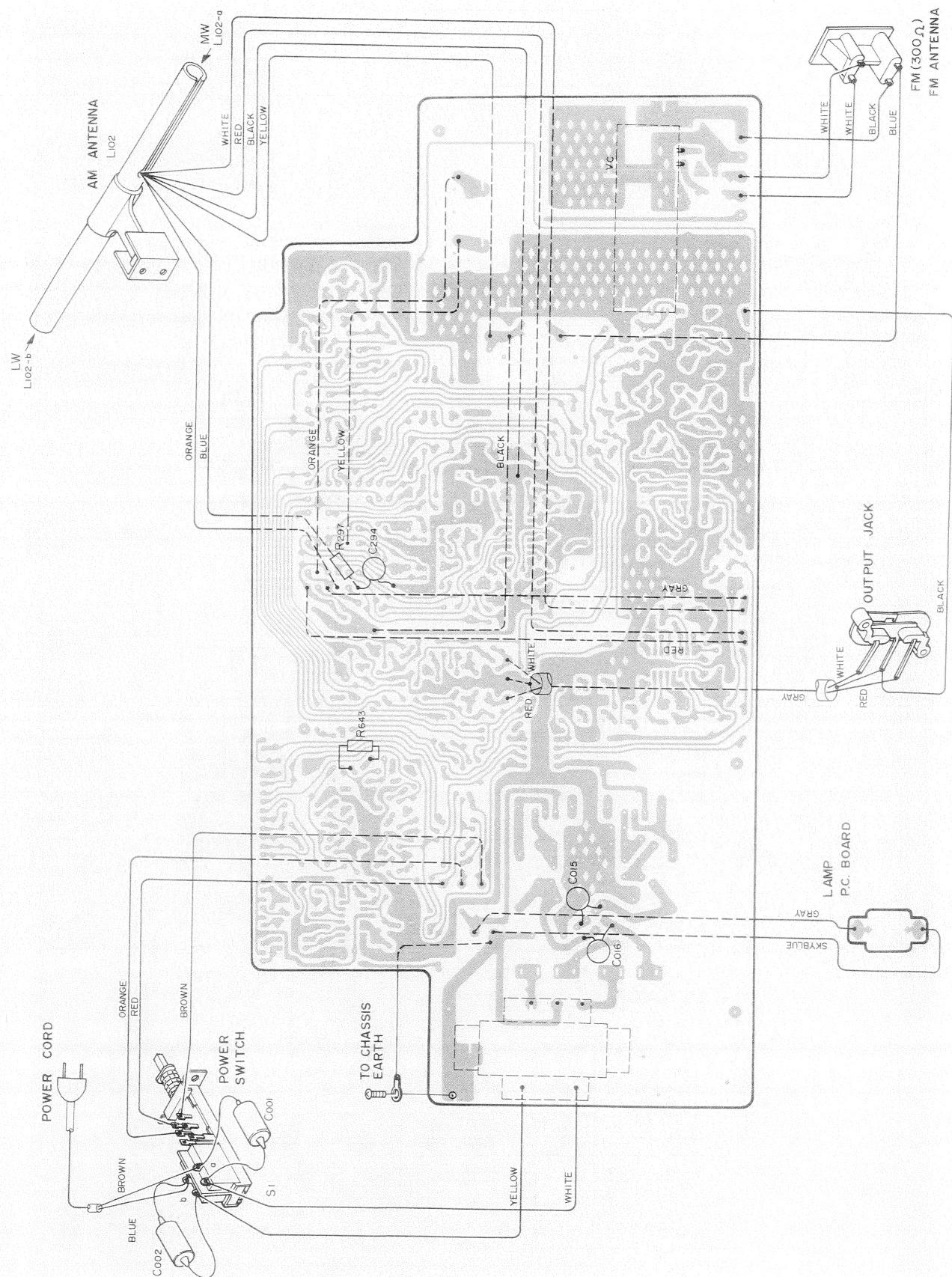


5. PRINTED CIRCUIT BOARDS

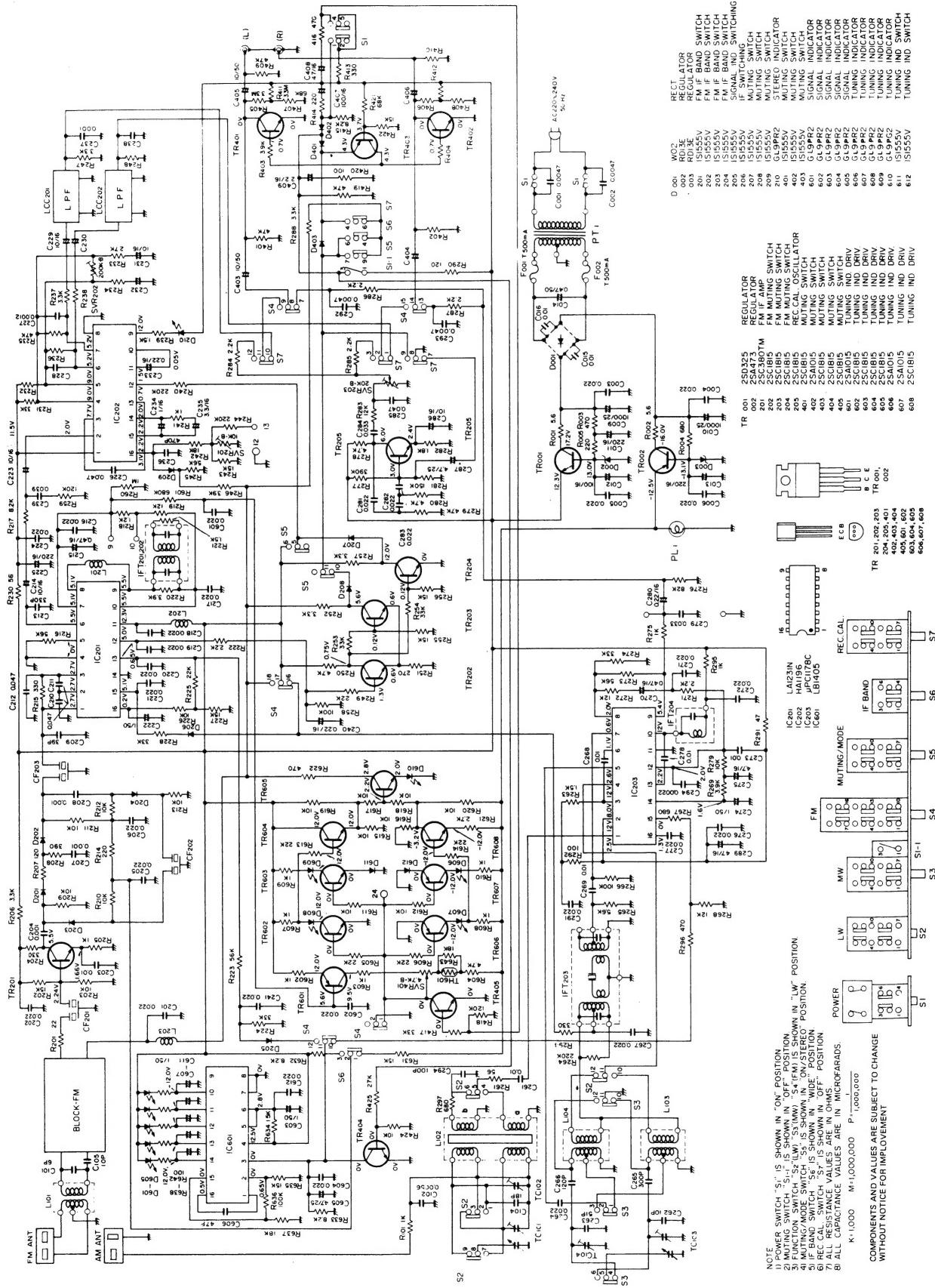
BOTTOM VIEW



BOTTOM VIEW OF P.C.B. AND WIRING

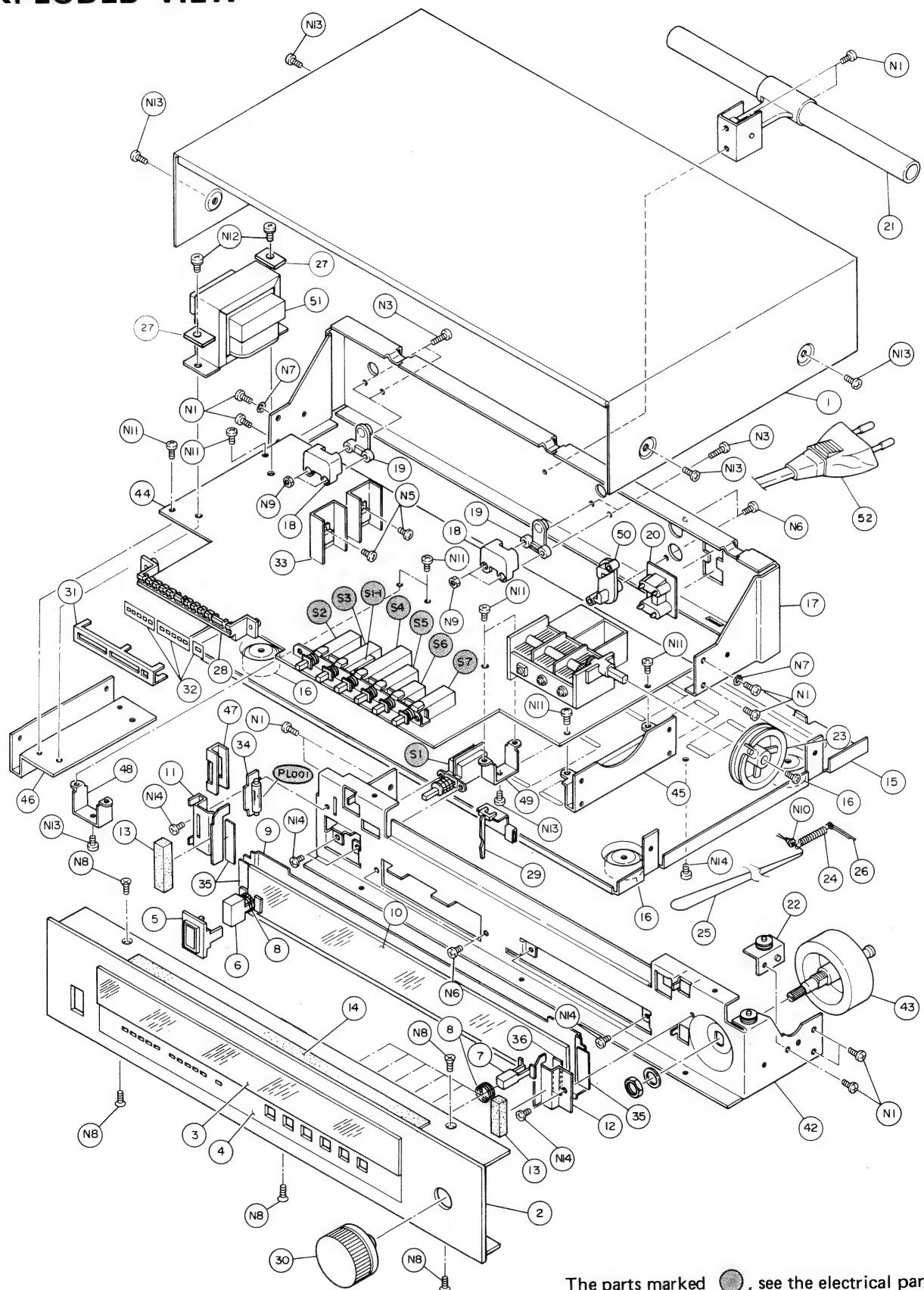


6. SCHEMATIC DIAGRAM



7. EXPLODED VIEW AND PARTS LISTS

EXPLODED VIEW



The parts marked , see the electrical parts list.

PARTS LIST

ELECTRICAL PARTS

Symbol No.	Part No.	Description
ICs		
IC201	22114700	IC, LA1231
IC202	22114586	IC, HA1196
IC203	22114726	IC, μ PC1178C
IC601	22114769	IC, LB1405
TRANSISTORS & DIODES		
TR001	22114478	Transistor, 2SD325-E
TR002	36500740	Transistor, 2SA473-Y
TR201	36707940	Transistor, 2SC380TM-0
TR202	36317460	Transistor, 2SC1815-GR
TR203	36317460	Transistor, 2SC1815-GR
TR204	36317460	Transistor, 2SC1815-GR
TR205	36317460	Transistor, 2SC1815-GR
TR401	36317480	Transistor, 2SC1815-BL
TR402	36534060	Transistor, 2SA1015-GR
TR403	36317480	Transistor, 2SC1815-BL
TR404	36317480	Transistor, 2SC1815-BL
TR405	36317480	Transistor, 2SC1815-BL
TR601	36534060	Transistor, 2SA1015-GR
TR602	36317460	Transistor, 2SC1815-GR
TR603	36317460	Transistor, 2SC1815-GR
TR604	36317460	Transistor, 2SC1815-GR
TR605	36317480	Transistor, 2SC1815-BL
TR606	36534060	Transistor, 2SA1015-GR
TR607	36534060	Transistor, 2SA1015-GR
TR608	36317460	Transistor, 2SC1815-GR
D001	22115251	Diode, W02
D002	22115574	Diode, RD13E-B3-M
D003	22115574	Diode, RD13E-B3-M
D201	37246703	Diode, 1S1555V
D202	37246703	Diode, 1S1555V
D203	37246703	Diode, 1S1555V
D204	37246703	Diode, 1S1555V
D205	37246703	Diode, 1S1555V
D206	37246703	Diode, 1S1555V
D207	37246703	Diode, 1S1555V
D208	37246703	Diode, 1S1555V
D209	37246703	Diode, 1S1555V
D210	22115469	Diode, GL-9PR2
D401	37246703	Diode, 1S1555V
D402	37246703	Diode, 1S1555V
D403	37246503	Diode, 1S1555V
D601	22115469	Diode, GL-9PR2
D602	22115469	Diode, GL-9PR2
D603	22115469	Diode, GL-9PR2
D604	22115469	Diode, GL-9PR2
D605	22115469	Diode, GL-9PR2

Symbol No.	Part No.	Description	
D606	22115469	Diode,	GL-9PR2
D607	22115469	Diode,	GL-9PR2
D608	22115469	Diode,	GL-9PR2
D609	22115469	Diode,	GL-9PR2
D610	22115552	Diode,	GL-9PG2
D611	37246703	Diode,	1S1555V
D612	37246703	Diode,	1S1555V
COILS & TRANSFORMERS			
L101	22294396	RF Coil, FM	
L102	22242775	Antenna Coil Assembly	
L103	22245357	OSC Coil, MW	
L104	22205060	OSC Coil, LW	
L201	22211229	Choke Coil, AF	
L202	22211229	Choke Coil, AF	
L203	22241041	Choke Coil, FM	
LCC201	22232228	MPX Filter	
LCC202	22232228	MPX Filter	
IFT201	22266335	IF Transformer, FM	
IFT202	22266336	IF Transformer, FM	
IFT203	22266337	IF Transformer, AM	
IFT204	22266334	IF Transformer, AM	
CAPACITORS			
Tolerance: D: $\pm 0.5\text{PF}$, J: $\pm 5\%$, K: $\pm 10\%$, M: $\pm 20\%$, P: +100 to -0%, Z:+80 to -20%,			
C001	22303026	Oil-Filled	0.0047 mfd/450WV
C002	22303026	Oil-Filled	0.0047 mfd/450WV
C003	22342223	Ceramic	0.022 mfd, Z
C004	22342223	Ceramic	0.022 mfd, Z
C005	22342223	Ceramic	0.022 mfd, Z
C006	22342223	Ceramic	0.022 mfd, Z
C009	22446102	Electrolytic	1000 mfd/25WV
C010	22446102	Electrolytic	1000 mfd/25WV
C011	22445221	Electrolytic	220 mfd/16WV
C012	22445101	Electrolytic	100 mfd/16WV
C013	22445221	Electrolytic	220 mfd/16WV
C014	22403085	Electrolytic	0.47 mfd/50WV
C015	22342103	Ceramic	0.01 mfd, Z
C016	22342103	Ceramic	0.01 mfd, Z
C101	22361609	Ceramic	6 PF, D
C102	22371562	Mylar	0.0056 mfd, J
C103	Not used		
C104	22361130	Ceramic	13 PF, J
C105	22361100	Ceramic	10 PF, D
C106	22343222	Ceramic	0.0022 mfd, M

Symbol No.	Part No.	Description		Symbol No.	Part No.	Description	
C107	22343222	Ceramic	0.0022 mfd, M	C272	22342223	Ceramic	0.022 mfd, Z
C108	22343102	Ceramic	0.001 mfd, M	C273	22343103	Ceramic	0.01 mfd, Z
C201	22342223	Ceramic	0.022 mfd, Z	C274	22448109	Electrolytic	1 mfd/50WV
C202	22342223	Ceramic	0.022 mfd, Z	C275	22446479	Electrolytic	4.7 mfd/25WV
C203	22342103	Ceramic	0.01 mfd, Z	C276	22342223	Ceramic	0.022 mfd, Z
C204	22343102	Ceramic	0.001 mfd, M	C277	22342223	Ceramic	0.022 mfd, Z
C205	22342223	Ceramic	0.022 mfd, Z	C278	22342103	Ceramic	0.01 mfd, Z
C206	22342223	Ceramic	0.022 mfd, Z	C279	22371333	Mylar	0.033 mfd, J
C207	22343102	Ceramic	0.001 mfd, M	C280	22440343	Electrolytic	0.22 mfd/50WV
C208	22343102	Ceramic	0.001 mfd, M	C281	22371223	Mylar	0.022 mfd, J
C209	22361390	Ceramic	39 PF, J	C282	22371223	Mylar	0.022 mfd, J
C210	22342473	Ceramic	0.047 mfd, Z	C283	22371223	Mylar	0.022 mfd, J
C211	22342473	Ceramic	0.047 mfd, Z	C284	22371333	Mylar	0.033 mfd, J
C212	22342473	Ceramic	0.047 mfd, Z	C285	22371473	Mylar	0.047 mfd, J
C213	22361331	Ceramic	330 PF, J	C286	22445100	Electrolytic	10 mfd/16WV
C214	22445100	Electrolytic	10 mfd/16WV	C287	22446479	Electrolytic	4.7 mfd/25WV
C215	22440305	Electrolytic	0.47 mfd/50WV	C288	Not used		
C216	22342223	Ceramic	0.022 mfd, Z	C289	22445470	Electrolytic	47 mfd/16WV
C217	22342223	Ceramic	0.022 mfd, Z	C290	Not used		
C218	22342223	Ceramic	0.022 mfd, Z	C291	22342223	Ceramic	0.022 mfd, Z
C219	22342223	Ceramic	0.022 mfd, Z	C292	22343472	Ceramic	0.0047 mfd, M
C220	22342223	Ceramic	0.022 mfd, Z	C293	22343472	Ceramic	0.0047 mfd, M
C221	22342223	Ceramic	0.022 mfd, Z	C294	22361101	Ceramic	100 PF, K
C222	22448109	Electrolytic	1 mfd/50WV	C403	22440325	Electrolytic	10 mfd/16WV
C223	22445100	Electrolytic	10 mfd/16WV	C404	22440325	Electrolytic	10 mfd/16WV
C224	22342223	Ceramic	0.022 mfd, Z	C405	22440325	Electrolytic	10 mfd/16WV
C225	22445221	Electrolytic	220 mfd/16WV	C406	22440325	Electrolytic	10 mfd/16WV
C226	22371473	Mylar	0.047 mfd, J	C407	22445101	Electrolytic	100 mfd/16WV
C227	22371122	Mylar	0.0012 mfd, J	C408	22446479	Electrolytic	4.7 mfd/25WV
C228	22371122	Mylar	0.0012 mfd, J	C409	22440306	Electrolytic	2.2 mfd/50WV
C229	22440325	Electrolytic	10 mfd/16WV	C601	22342223	Ceramic	0.022 mfd, Z
C230	22440325	Electrolytic	10 mfd/16WV	C602	22342223	Ceramic	0.022 mfd, Z
C231	22445100	Electrolytic	10 mfd/16WV	C603	22448109	Electrolytic	1 mfd/50WV
C232	22445100	Electrolytic	10 mfd/16WV	C604	Not used		
C233	22402051	Aluminum	0.22 mfd, K	C605	22446479	Electrolytic	4.7 mfd/25WV
C234	22402054	Aluminum	1 mfd/16WV	C606	22361470	Ceramic	47 PF, J
C235	22402056	Aluminum	3.3 mfd/16WV	C607	22448109	Electrolytic	1 mfd/50WV
C236	22391471	Polypropylene	470 PF, J	C608	22448109	Electrolytic	1 mfd/50WV
C237	22371102	Mylar	0.001 mfd, J	C609	22448109	Electrolytic	1 mfd/50WV
C238	22371102	Mylar	0.001 mfd, J	C610	22448109	Electrolytic	1 mfd/50WV
C239	22371393	Mylar	0.039 mfd, J	C611	22448109	Electrolytic	1 mfd/50WV
C240	22440343	Electrolytic	0.22 mfd/50WV	C612	22342223	Ceramic	0.022 mfd, Z
C241	22342223	Ceramic	0.022 mfd, Z	TC101	22309104	Trimmer	
C261	22342103	Ceramic	0.01 mfd, Z	TC102	22309104	Trimmer	
C262	22360487	Ceramic	51 PF, J	TC103	22309104	Trimmer	
C263	22360480	Ceramic	10 PF, D	TC104	22309104	Trimmer	
C264	22371223	Mylar	0.022 Mfd, J				
C265	22360482	Ceramic	120 PF, J				
C266	22360483	Ceramic	300 PF, J				
C267	22342223	Ceramic	0.022 mfd, Z				
C268	22342103	Ceramic	0.01 mfd, Z				
C269	22342103	Ceramic	0.01 mfd, Z				
C270	22440305	Electrolytic	0.47 mfd/50WV				
C271	22371223	Mylar	0.022 mfd, J				

Symbol No.	Part No.	Description			
RESISTORS					
All fixed resistors are 1/8W, ±5%, carbon resistor unless otherwise noted.					
Tolerance: J: ±5%, K: ±10%					
R001	22573569	Metal oxide	5.6 ohm, 2W		
R002	22573569	Metal Oxide	5.6 ohm, 2W		
R003	22571471	Metal Oxide	470 ohm, 1W		
R004	22571681	Metal Oxide	680 ohm, 1W		
R005	22571221	Metal Oxide	220 ohm, 1W		
R101	22543102	1K ohm			
R201	22543220	22 ohm			
R202	22543153	15K ohm			
R203	22543103	10K ohm			
R204	22543331	330 ohm			
R205	22543102	1K ohm			
R206	22543332	3.3K ohm			
R207	22543121	120 ohm			
R208	22543391	390 ohm			
R209	22543103	10K ohm			
R210	22543103	10K ohm			
R211	22543103	10K ohm			
R212	22543103	10K ohm			
R213	22543103	10K ohm			
R214	22543221	220 ohm			
R215	22543331	330 ohm			
R216	22543563	56K ohm			
R217	22543822	8.2K ohm			
R218	22543122	1.2K ohm			
R219	22543123	12K ohm			
R220	22543392	3.9K ohm			
R221	22543152	1.5K ohm			
R222	22543222	2.2K ohm			
R223	22543563	56K ohm			
R224	22543333	33K ohm			
R225	22543223	22K ohm			
R226	22543103	10K ohm			
R227	22543153	15K ohm			
R228	22543333	33K ohm			
R229	Not used				
R230	22500200	Fusible 56 ohm, 1/4W, J			
R231	22543333	33K ohm			
R232	22543333	33K ohm			
R233	22543272	2.7K ohm			
R234	22543272	2.7K ohm			
R235	22543473	47K ohm			
R236	22543473	47K ohm			
R237	22543332	3.3K ohm			
R238	22543332	3.3K ohm			
R239	22543152	1.5K ohm, 1/4W (J)			
R240	22543224	220K ohm			
R241	22543102	1K ohm			
R242	22543183	18K ohm			
R243	22543153	15K ohm			
R244	22543224	220K ohm			
R245	22543562	5.6K ohm			

Symbol No.	Part No.	Description	
R246	22543392	3.9K ohm	
R247	22543332	3.3K ohm	
R248	22543332	3.3K ohm	
R249	22543223	22K ohm	
R250	22543472	4.7K ohm	
R251	22543271	270K ohm	
R252	22543332	3.3K ohm	
R253	22543333	33K ohm	
R254	22543333	33K ohm	
R255	22543153	15K ohm	
R256	22543153	15K ohm	
R257	22543332	3.3K ohm	
R258	22543104	100K ohm	
R259	22543124	120K ohm	
R260	22543105	1M ohm	
R261	22543560	56 ohm	
R262	Not used		
R263	22543152	1.5K ohm	
R264	22543224	220K ohm	
R265	22543562	5.6K ohm	
R266	22543104	100K ohm	
R267	22543561	680 ohm	
R268	22543123	12K ohm	
R269	22543392	3.9K ohm	
R270	22543103	10K ohm	
R271	22543222	2.2K ohm	
R272	22543123	12K ohm	
R273	22543563	56K ohm	
R274	22543333	33K ohm	
R275	22543102	1K ohm	
R276	22543823	82K ohm	
R277	22543394	390K ohm	
R278	22543472	4.7K ohm	
R279	22543472	4.7K ohm	
R280	22543472	4.7K ohm	
R281	22543154	150K ohm	
R282	22543182	1.8K ohm	
R283	22543123	12K ohm	
R284	22543222	2.2K ohm	
R285	22543222	2.2K ohm	
R286	22543222	2.2K ohm	
R287	22543222	2.2K ohm	
R288	22543332	3.3K ohm	
R289	Not used		
R290	22543121	120 ohm	
R291	22500246	Fusible 46 ohm, 1/4W, J	
R292	22543101	100 ohm	
R293	Not used		
R294	22543331	330 ohm	
R295	22543102	1K ohm	
R296	22543471	470 ohm	
R297	22543681	680 ohm	
R401	22543473	47K ohm	
R402	22543473	47K ohm	

Symbol No.	Part No.	Description
R403	22543392	3.9K ohm
R404	22543392	3.9K ohm
R405	22543335	3.3M ohm
R406	22543335	3.3M ohm
R407	22543683	68K ohm
R408	22543683	68K ohm
R409	22543473	47K ohm
R410	22543473	47K ohm
R411	22543335	3.3M ohm
R412	22543335	3.3M ohm
R413	22543331	330 ohm
R414	22543221	220 ohm
R415	22543822	8.2K ohm
R416	22543471	470 ohm
R417	22543333	33K ohm
R418	22543124	120K ohm
R419	22543473	47K ohm
R420	22543101	100 ohm
R421	22543683	68K ohm
R422	22543153	15K ohm
R423	Not used	
R424	22543103	10K ohm
R425	22543273	27K ohm
R601	22543684	680K ohm
R602	22543102	1K ohm
R603	22543102	1K ohm
R604	22543472	4.7K ohm
R605	22543223	22K ohm
R606	22543223	22K ohm
R607	22543102	1K ohm
R608	22543102	1K ohm
R609	22543102	1K ohm
R610	22543102	1K ohm
R611	22543103	10K ohm
R612	22543103	10K ohm
R613	22543223	22K ohm
R614	22543223	22K ohm
R615	22543103	10K ohm
R616	22543103	10K ohm
R617	22543103	10K ohm
R618	22543103	10K ohm
R619	22543103	10K ohm
R620	22543103	10K ohm
R621	22543272	2.7K ohm
R622	22543471	470 ohm, 1/4W J
R631	22543153	15K ohm
R632	22543822	8.2K ohm
R633	22543822	8.2K ohm
R634	22543152	1.5K ohm
R635	22543123	12K ohm
R636	22543104	100K ohm
R637	22543183	18K ohm
R638	22543101	100 ohm
R639	22543101	100 ohm

Symbol No.	Part No.	Description
R640	22543101	100 ohm
R641	22543101	100 ohm
R642	22543101	100 ohm
R643	22553183	18K ohm
SVR201	22658470	Semi-Fixed 200K ohm
SVR202	22658514	Semi-Fixed 10K ohm
SVR203	22658455	Semi-Fixed 20K ohm
SVR601	22658444	Semi-Fixed 4.7K ohm
MISCELLANEOUS		
CF201	22153068	Ceramic Filter
CF202	22153068	Ceramic Filter
CF203	22153068	Ceramic Filter
F001	22144192	Fuse, 0.5A.T
F002	22144192	Fuse, 0.5A.T
	22165047	Fuse Holding Terminal
S1	22140556	Push Switch (Power)
S2~S7	22140610	Push Switch (FUNCTION, MUTING/MODE, IF BAND, REC. CAL.)
TH601	22691081	Thermister (TH-112132-45311)
PT1	22223518	Power Transformer
	22176529	Power Cord
	22131222	Block-FM
PL001	22113473	Pilot Lamp 0.2A/12V

EXPLODED VIEW PARTS

Symbol No.	Part No.	Description
1	20848607	Top Cover
2	20713845	Front Panel
3	20848601	Dial Cover
4	20779928	Name Plate
5	20743973	Button Guide
6	20874668	Push Button
7	20874667	Push Button
8	22772611	Spring
9	22837836	Dial Back
10	22837835	Dial Plate
11	20746989	Light Support
12	20746990	Dial Support
13	22756840	Cushion
14	22756528	Cushion
15	22832822	Bottom Cover
16	20842649	Foot
17	20015804	Back Chassis
18	22754791	Cord Calmper
19	22184183	Cord Clamper
20	22167634	DIN2P Socket Assembly
21	22242775	Antenna Coil Assembly (L102)
22	20746992	Pulley Support
23	20042715	Drum
24	22771618	Pull Spring
25	22745502	Dial String
26	54301010	Sprit Pin
27	20791809	Special Washer
28	20746991	LED Support
29	20041664	Pointer Assembly
30	20872620	Tuning Knob
31	20743976	LED Guide
32	20773899	LED Spacer
33	22848794	Radiator
34	22193153	Lamp P.C. Board
35	22756533	Cushion
36	22756976	Cushion
37	Not Used	
38	Not Used	
39	Not Used	
40	Not Used	
41	Not Used	
42	20015796	Chassis
43	20042700	Tuning Shaft
44	22193152	Radio P.C. Board
45	20735693	Bracket
46	20735698	Power Transformer Bracket
47	22748853	Barrier
48	20746994	P.C. Board Support
49	20746995	P.C. Board Support
50	22163765	Jack, US2P
51	22223518	Power Transformer PT1
52	22176529	Power Cord

Symbol No.	Part No.	Description
SCREWS & RINGS		
N1	70433006	Bind Head 3.0 x 6mm
N2	Not Used	
N3	22701716	Bind Head 3.0 x 14mm
N4	Not Used	
N5	72633008	Bind Head Tapping 3.0 x 8mm
N6	22701724	Bind Head Tapping 3.0 x 10mm
N7	74022030	Lock Washer 3.0φ
N8	70443006	Flat Head Screw 3.0 x 6mm
N9	73653000	Nut 3.0
N10	75820352	Eyelet 2.0φ x 2mm
N11	22701586	Pan Head 3.0 x 8mm with W/SW
N12	22701711	Pan Head 4.0 x 8mm with W/SW
N13	20795986	Bind Head 3.0x8mm with SW
N14	20795955	Bind Head 3.0x6mm with SW
ACCESSORIES		
	22124266	FM Antenna
	22953918	Owner's Manual
	22951862	Warranty Card

MEMO

MODEL TP2200

1. SPECIFICATIONS

Rated Output Impedance	0.775V/4.7 k ohms
Input Sensitivity and Impedance	
Phono	2.5mV/47 k ohms
AUX	150mV/80 k ohms
Tuner	150mV/80 k ohms
TAPE-1, TAPE-2	150mV/80 k ohms
Microphone	1.0mV/10 k ohms
Recording Output	
RCA Pin Terminal (TAPE-1)	150mV
DIN Terminal (TAPE-1, TAPE-2)	0.5mV/k ohms
Maximum Input at PHONO	150mV
Frequency Response	
PHONO refer to RIAA	±0.2 dB
Tuner, AUX, TAPE-1, TAPE-2	
20 – 20,000 Hz ref. 1 kHz	±1 dB
Tone Control	
Bass at 50 Hz	±8 dB
Middle at 1,000 Hz	±8 dB
Treble at 20,000 Hz	±8 dB

Subsonic Filter (turn over: 20 Hz)	-6 dB/Oct
High Cut Filter (turn over: 7 kHz)	-6 dB/Oct
Loudness Control at 100 Hz (-30 dB attenuated)	+8 dB
Total Harmonic Distortion at 20 – 20,000 Hz, 1 Volt Output	
PHONO	0.02%
Tuner	0.01%
AUX, TAPE-1, TAPE-2	0.01%
Signal to Noise Ratio (IHF-A)	
PHONO	75 dB
AUX, Tuner, TAPE-1, TAPE-2	90 dB
Power Supply	220 to 240 Volts 50 Hz ~
Dimensions	430(W) x 80(H) x 250(D) mm
Weight	4.5 kg

2. DISASSEMBLY INSTRUCTIONS

(1) Top cover removal

Remove four screws on the both sides of the set and lift up the top cover.

(2) Bottom cover removal

Remove a screw on the center of the bottom cover and lift it up.

(3) Front panel removal

Remove seven rotary knobs.

Remove six screws (A) from top and bottom as shown in Figure 10 and 11, and the panel can be removed with push buttons.

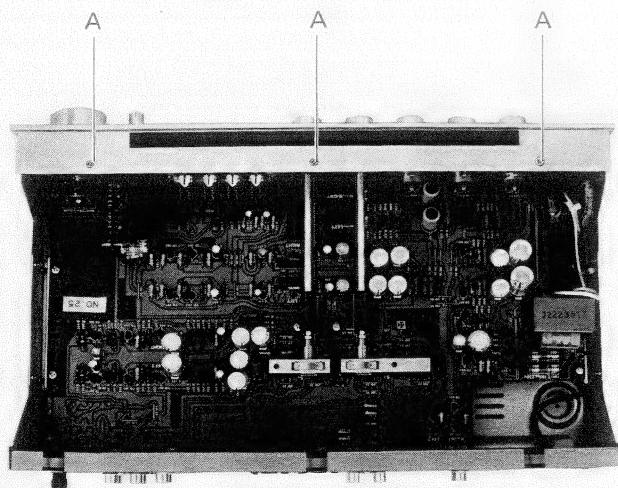


Figure 10

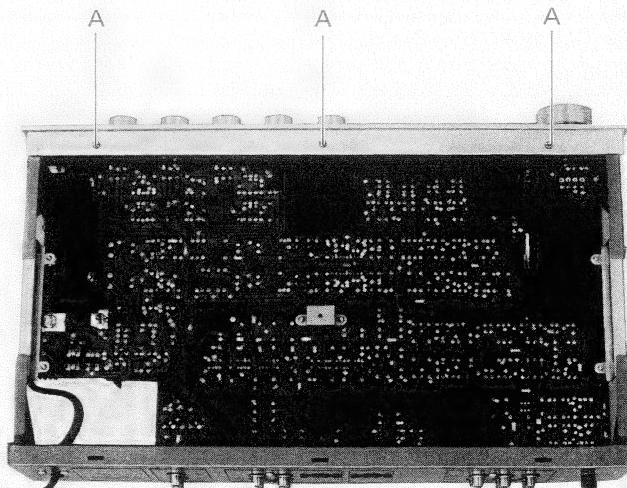


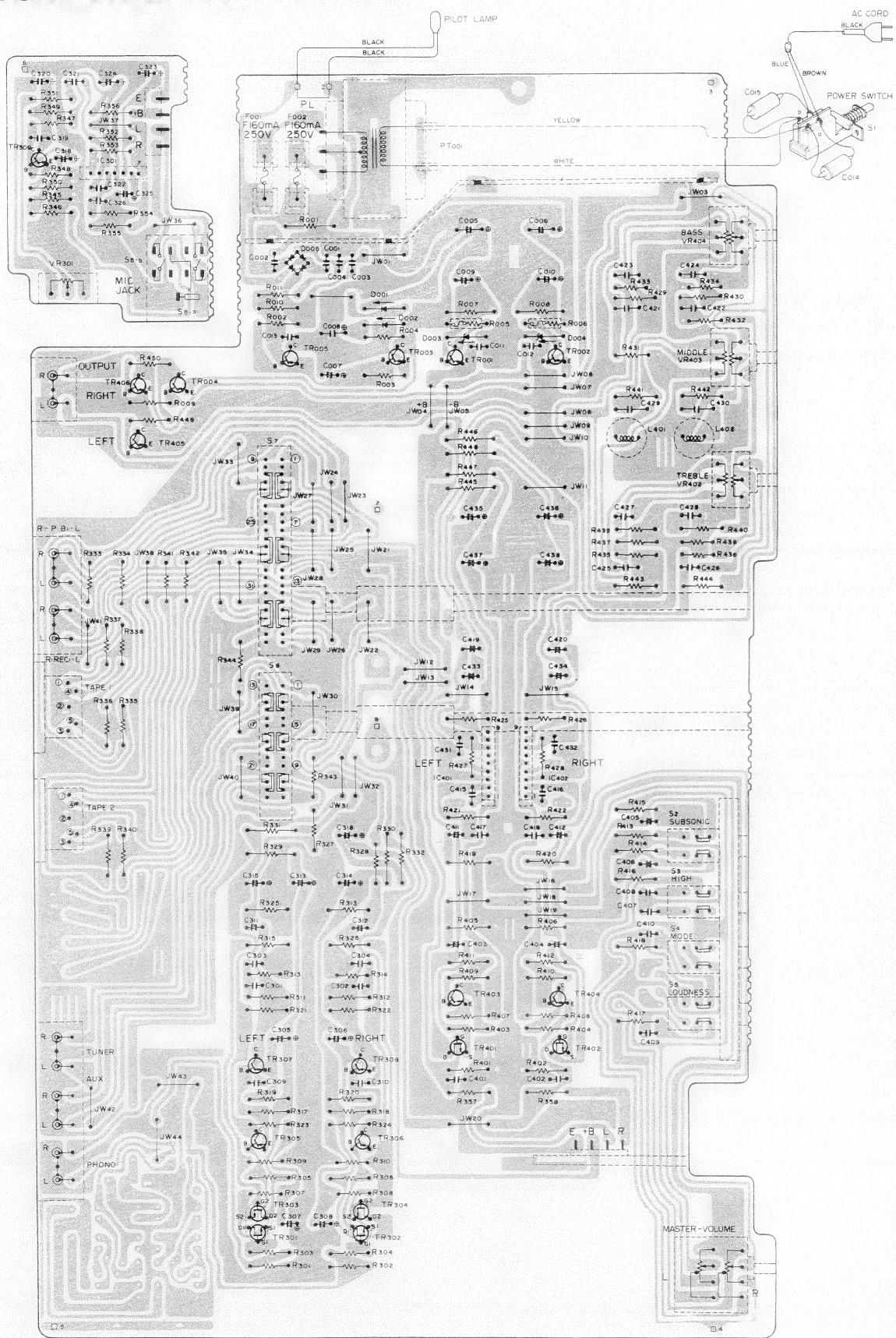
Figure 11

NOTE:

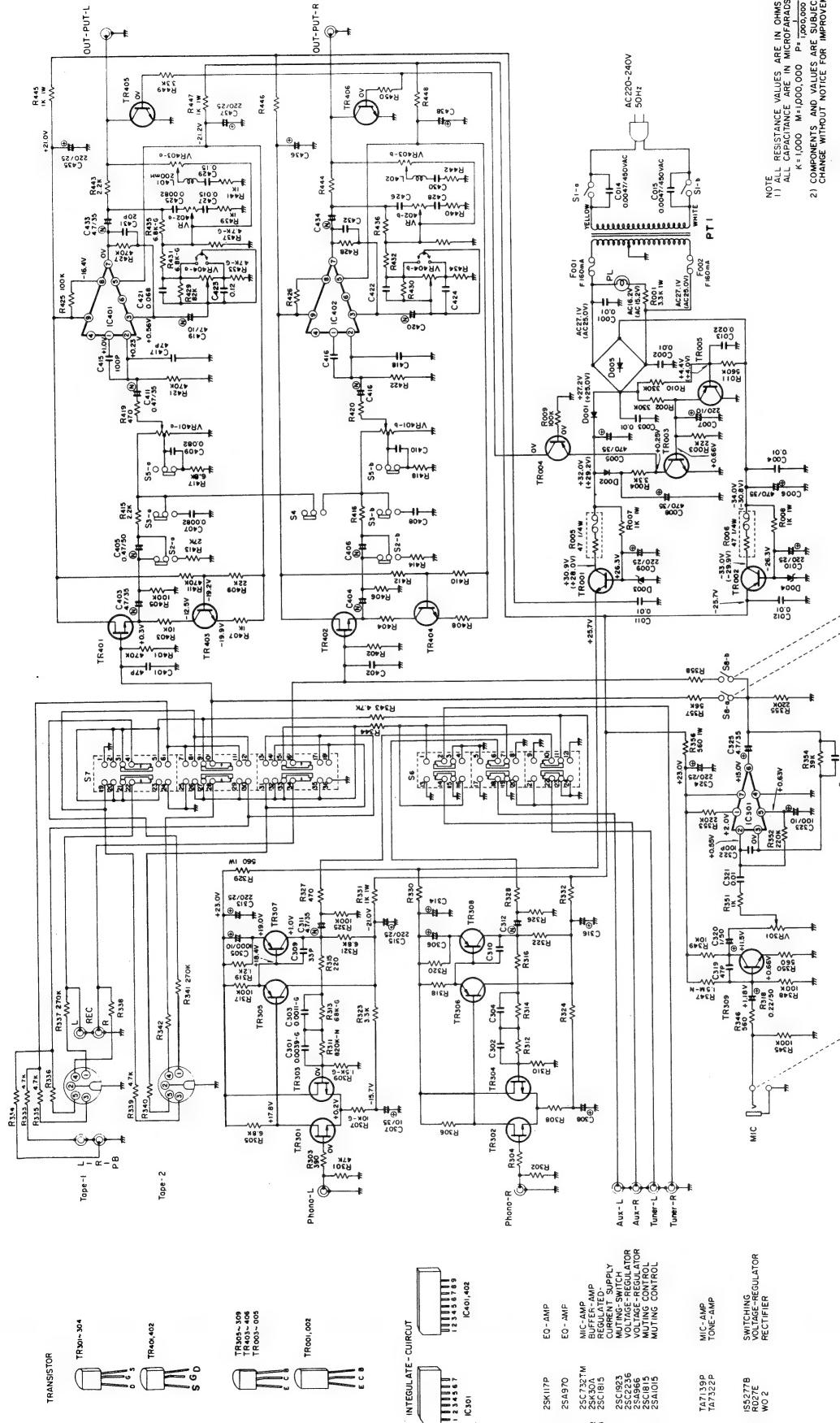
This model has no alignment point.

3. PRINTED CIRCUIT BOARDS BOTTOM VIEW AND WIRING

TP2200



4. SCHEMATIC DIAGRAM



2) COMPONENTS AND VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICE FOR IMPROVEMENT

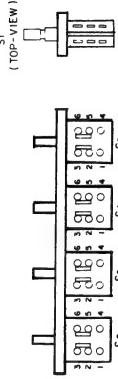
POSITION
ON
OFF
ON
OFF
STEREO
OFF
ON
OFF

POWER SWITCH: S1
HIGH CUT FILTER: S2
MODE-SWITCH: S3
LOUDNESS SWITCH: S4
TUNER SW: S5
MIC SW: S6
AUX PHONO-TUNER SOURCE TAPE 2-2-1
MICROPHONE: S7

AC 220-240V
50Hz
PTI

NOTE: ALL RESISTANCE VALUES ARE IN OHMS
(1) ALL CAPACITANCE VALUES ARE IN MICROFARADS

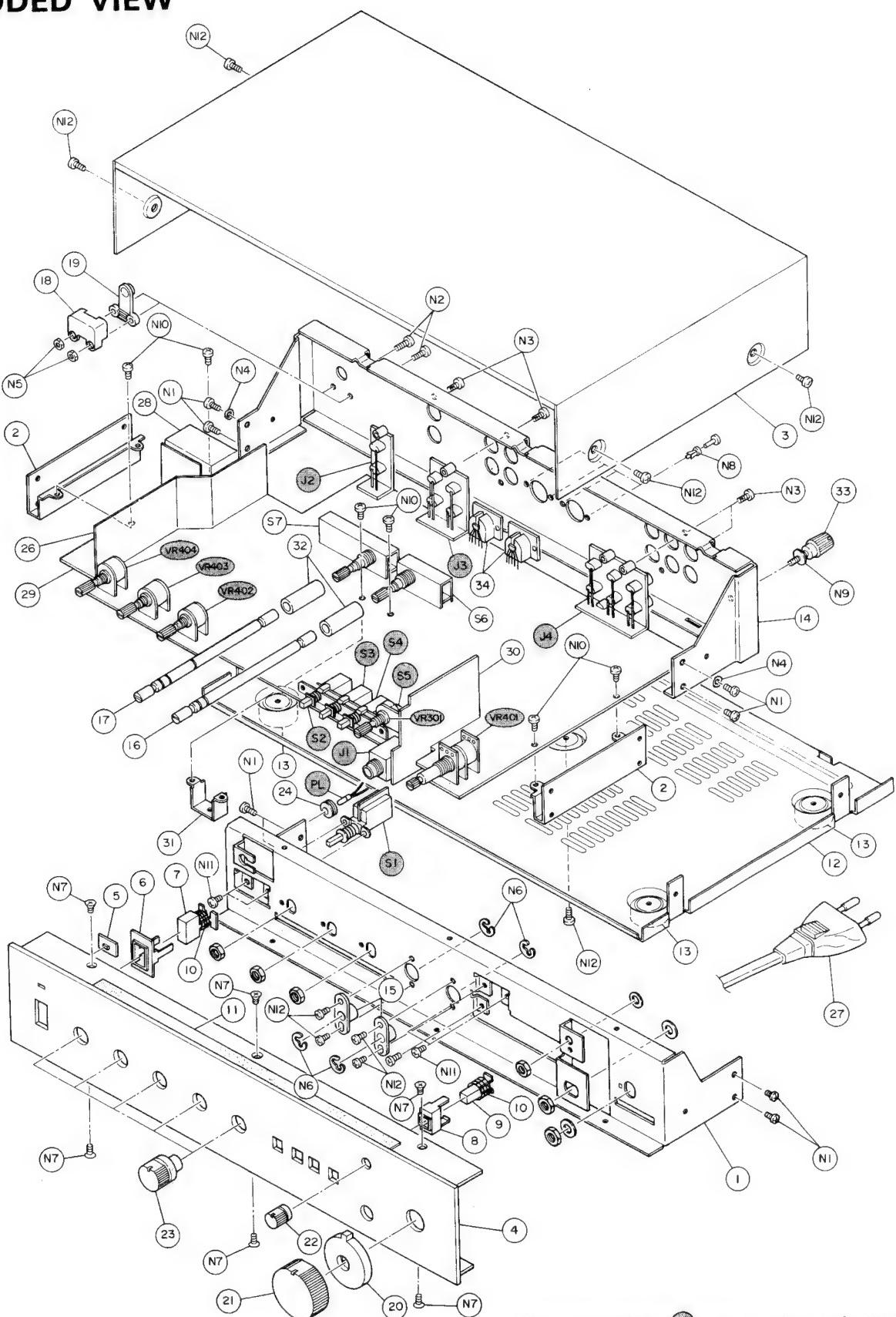
2) COMPONENTS AND VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICE FOR IMPROVEMENT



5. EXPLODED VIEW AND PARTS LISTS

EXPLODED VIEW

TP2200



Symbol No.	Part No.	Description		Symbol No.	Part No.	Description	
C427	22371153	Mylar	0.015 mfd, J	R324	22545332	3.3K ohm	
C428	22371153	Mylar	0.015 mfd, J	R325	22545104	100K ohm	
C429	22371154	Mylar	0.15 mfd, J	R326	22545104	100K ohm	
C430	22371154	Mylar	0.15 mfd, J	R327	22545471	470 ohm	
C431	22361200	Ceramic	20 PF, J	R328	22545471	470 ohm	
C432	22361200	Ceramic	20 PF, J	R329	22571561	Metal Oxide	560 ohm, 1W
C433	22403080	Electrolytic	4.7 mfd/35WV(N)	R330	22571561	Metal Oxide	560 ohm, 1W
C434	22403080	Electrolytic	4.7 mfd/35WV(N)	R331	22571102	Metal Oxide	1K ohm, 1W
C435	22446221	Electrolytic	220 mfd/25WV	R332	22571102	Metal Oxide	1K ohm, 1W
C436	22446221	Electrolytic	220 mfd/25WV	R333	22545472	4.7K ohm	
C437	22446221	Electrolytic	220 mfd/25WV	R334	22545472	4.7K ohm	
C438	22446221	Electrolytic	220 mfd/25WV	R335	22545472	4.7K ohm	
RESISTORS							
All fixed resistors are $\frac{1}{4}$ W, $\pm 5\%$, carbon resistor unless otherwise noted.							
Tolerance: G: $\pm 2\%$, J: $\pm 5\%$, K: $\pm 10\%$							
R001	22571332	Metal Oxide	3.3K ohm, 1W	R345	22545104	100K ohm	
R002	22545334	330K ohm		R346	22545561	560 ohm	
R003	22545223	22K ohm		R347	22510018	1.5M ohm, $\frac{1}{4}$ W, Low Noise	
R004	22545332	3.3K ohm		R348	22545104	100K ohm	
R005	22500246	Fusible	47 ohm $\frac{1}{4}$ W, J	R349	22545103	10K ohm	
R006	22500246	Fusible	47 ohm $\frac{1}{4}$ W, J	R350	22545561	560 ohm	
R007	22571152	Metal Oxide	1.5K ohm, 1W	R351	22545102	1K ohm	
R008	22571152	Metal Oxide	1.5K ohm, 1W	R352	22545224	220K ohm	
R009	22545104	100K ohm		R353	22454224	220K ohm	
R010	22545334	330K ohm		R354	22545393	39K ohm	
R011	22545564	560K ohm		R355	22545224	220K ohm	
R301	22545473	47K ohm		R356	22571561	Metal Oxide	560 ohm, 1W
R302	22545473	47K ohm		R357	22545563	56K ohm	
R303	22545391	390 ohm		R358	22545563	56K ohm	
R304	22545391	390 ohm		R401	22545474	470K ohm	
R305	22545682	6.8K ohm		R402	22545474	470K ohm	
R306	22545682	6.8K ohm		R403	22545103	10K ohm	
R307	22570537	Metal Oxide	10K ohm, $\frac{1}{4}$ W, G	R404	22545103	10K ohm	
R308	22570537	Metal Oxide	10K ohm, $\frac{1}{4}$ W, G	R405	22545104	100K ohm	
R309	22570528	Metal Oxide	1.5K ohm, $\frac{1}{4}$ W, G	R406	22545104	100K ohm	
R310	22570528	Metal Oxide	1.5K ohm, $\frac{1}{4}$ W, G	R407	22545102	1K ohm	
R311	22510017	820K ohm, $\frac{1}{4}$ W, Low Noise		R408	22545102	1K ohm	
R312	22510017	820K ohm, $\frac{1}{4}$ W, Low Noise		R409	22545223	22K ohm	
R313	22570541	Metal Oxide	68K ohm, $\frac{1}{4}$ W, G	R410	22545223	22K ohm	
R314	22570541	Metal Oxide	68K ohm, $\frac{1}{4}$ W, G	R411	22545474	470K ohm	
R315	22545221	220 ohm		R412	22545474	470K ohm	
R316	22545221	220 ohm		R413	22545273	27K ohm	
R317	22545104	100K ohm		R414	22545273	27K ohm	
R318	22545104	100K ohm		R415	22545222	2.2K ohm	
R319	22545122	1.2K ohm		R416	22545222	2.2K ohm	
R320	22545122	1.2K ohm		R417	22545682	6.8K ohm	
R321	22545682	6.8K ohm		R418	22545682	6.8K ohm	
R322	22545632	6.8K ohm		R419	22545471	470 ohm	
R323	22545332	3.3K ohm					

Symbol No.	Part No.	Description
ACCESSORIES		
	22164839	US1P Short-plug
	22164836	US1P Plug Cord
	22953919	Owner's Manual
	22951862	Warranty Card

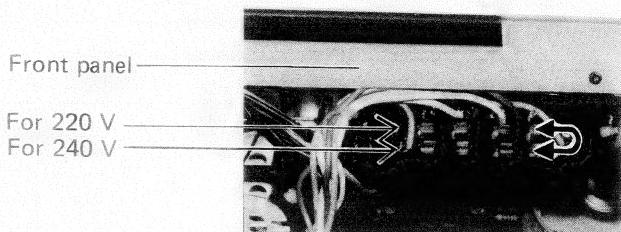
MODEL TM2250

1. SPECIFICATIONS

Power Output	50 Watts per channel at 4 ohms from 20 to 20,000 Hz, both channels driven 0.08% T.H.D.
Damping Factor at 1 kHz 4 ohms	30
Frequency Response (-1.5 dB)	5 to 60 kHz
Signal to Noise Ratio (IHF-A)	110 dB
Power Supply	AC 220/240 Volts 50 Hz ~
Dimensions	430(W) x 80(H) x 250(D) mm
Weight	7.5 kg

NOTE:

According to the power supply voltage, select the position of fuses.



2. DISASSEMBLY INSTRUCTIONS

(1) Top cover removal

Remove four screws on the both sides of the set and lift up the top cover.

(2) Bottom cover removal

Remove a screw on the center of the bottom cover and lift the bottom cover.

(3) Front panel removal

Remove a speaker selector knob.

Remove six screws (A) from top and bottom as shown in Figure 12 and 13, and the front panel with push buttons can be removed.

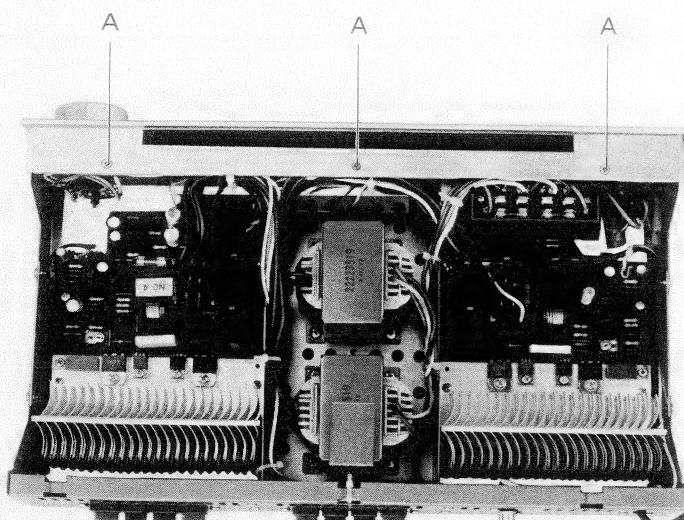


Figure 12

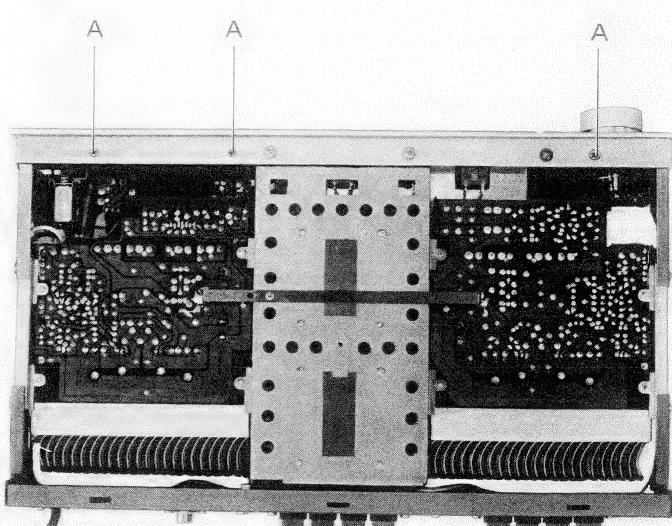


Figure 13

3. ALIGNMENT INSTRUCTIONS

IDLE CURRENT

TEST EQUIPMENTS

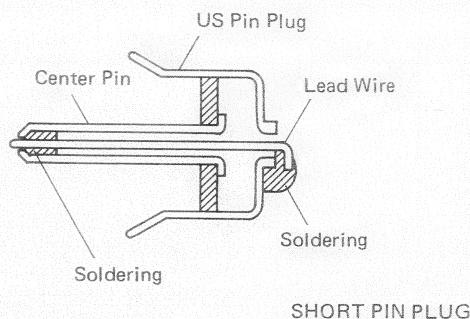
- (1) VTVM (DC).
- (2) Short pin plugs (Accessoires of pre-amplifier or Figure).

NOTE:

- (1) Align after five minutes when power has been supplied.

ALIGNMENT (For alignment point, See Figure 16.)

- (1) Connect test equipments as shown in Figure 14.
- (2) Short the input terminal with short pin plugs.
- (3) Adjust the SVR 501 (L ch), and SVR 502 (R ch) as the VTVM indicates 20mV DC.



SHORT PIN PLUG

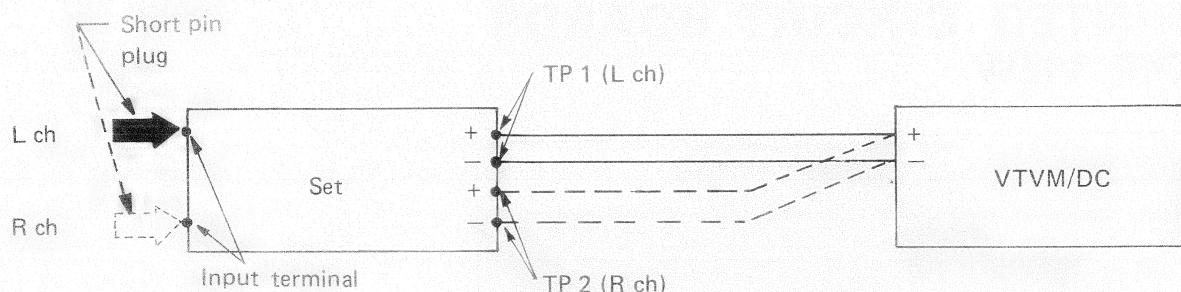


Figure 14

METER INDICATION

TEST EQUIPMENT

- (1) AF oscillator.
- (2) VTVM (AC).
- (3) Dummy loads (4 ohms above 1W).

NOTE:

- (1) Don't short the speaker terminals.

ALIGNMENT (For alignment point, See Figure 16.)

- (1) Set the meter range selector of peak-power-meter to xl (■) position.
- (2) Set the speaker selector knob to SPEAKER A position.
- (3) Connect test equipment as shown in Figure 15.
- (4) Control the output of AF oscillator as the VTVM indicates 2V AC.
- (5) Adjust the indication of peak-power-meter to be 1W with SVR601 (L ch) and SVR602 (R ch).

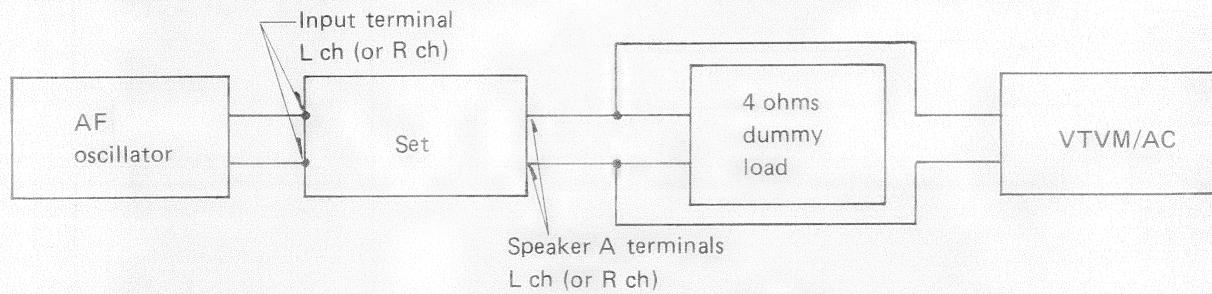


Figure 15

ALIGNMENT POINTS

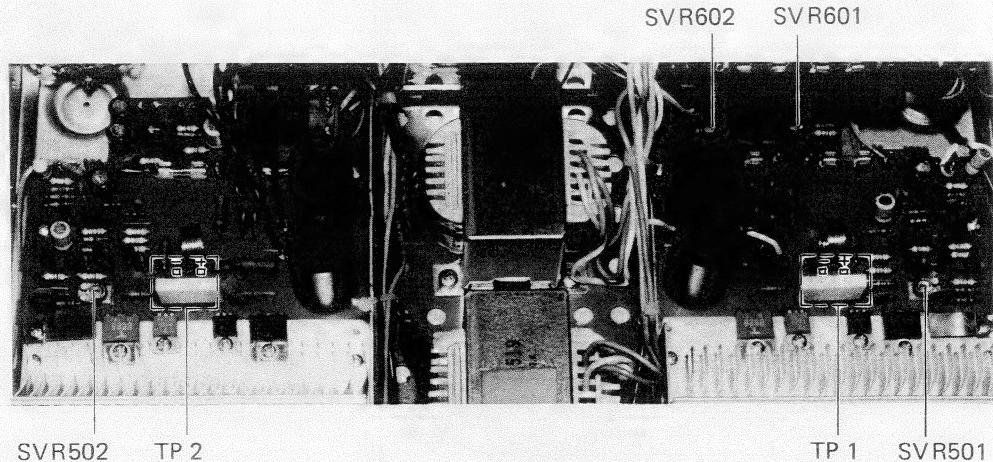
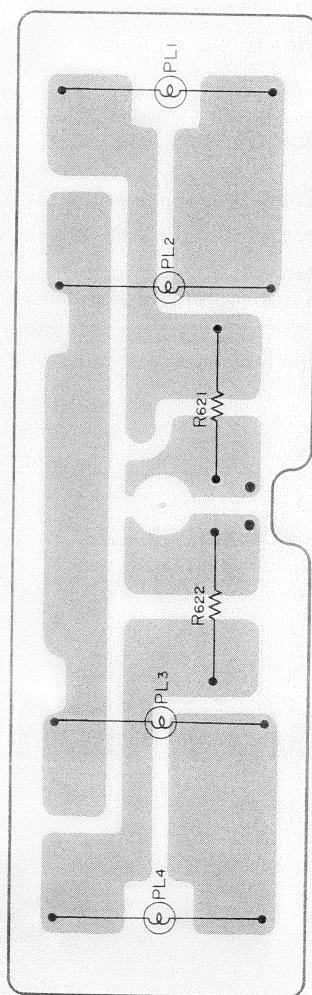
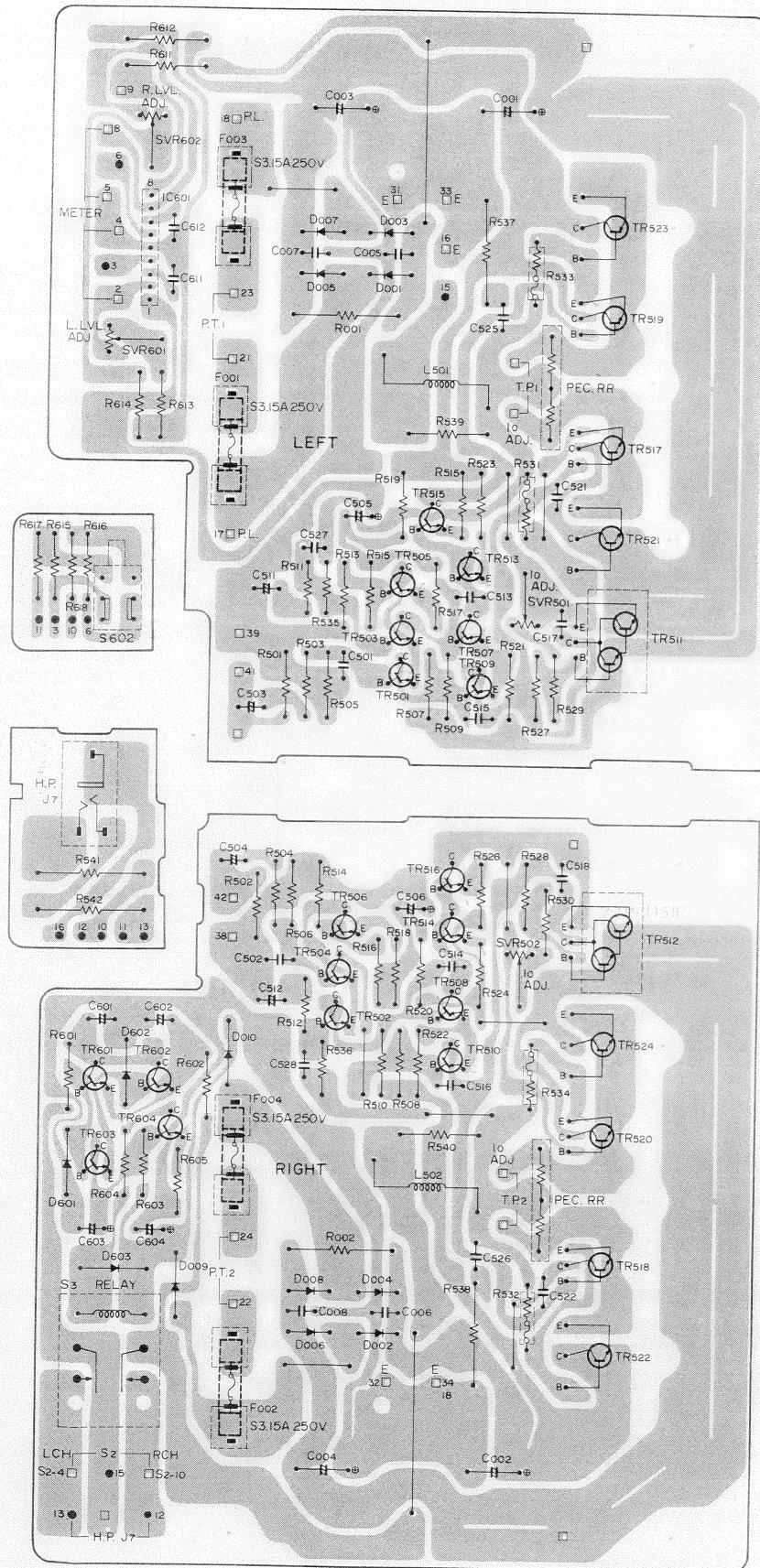
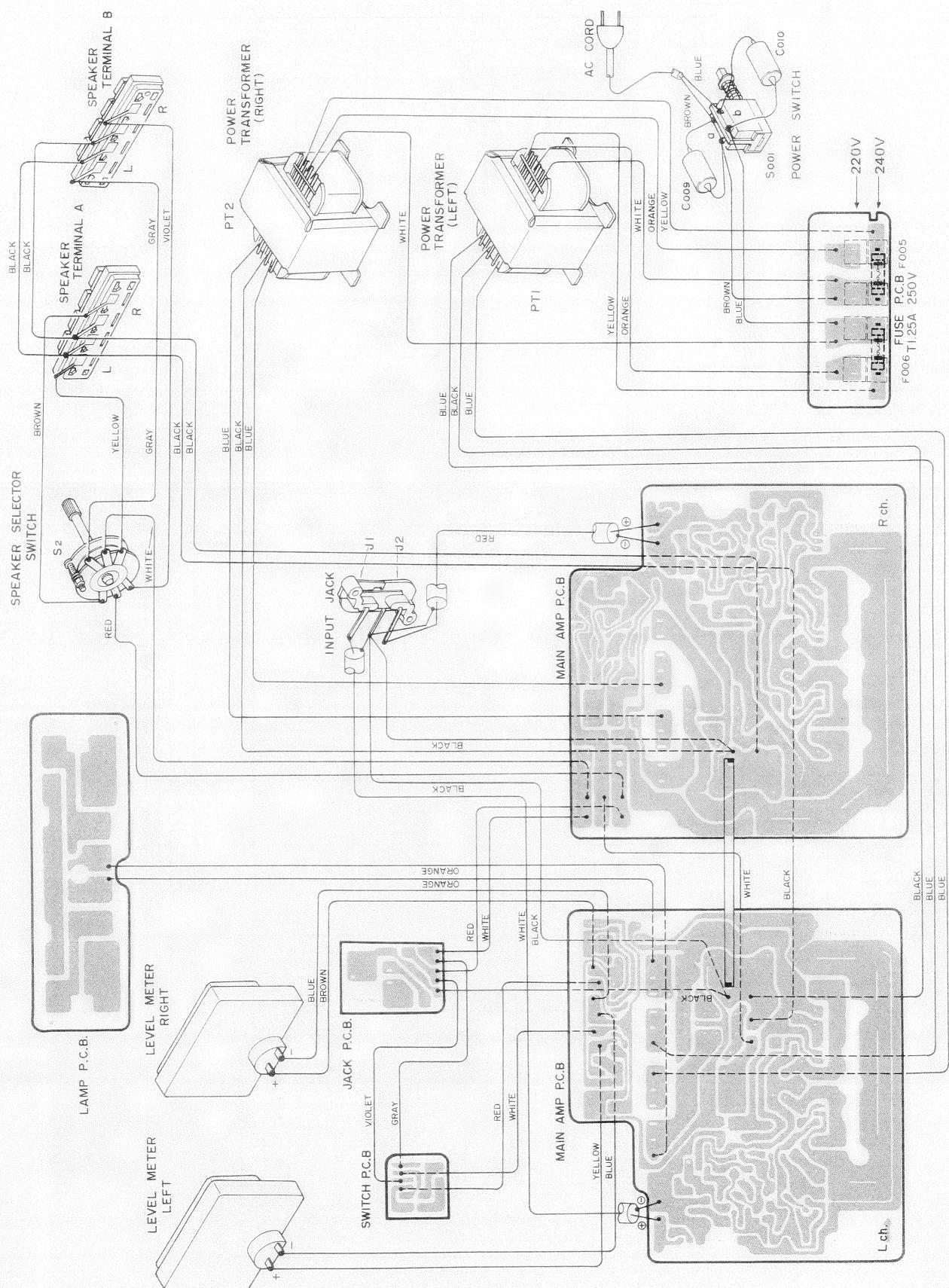


Figure 16

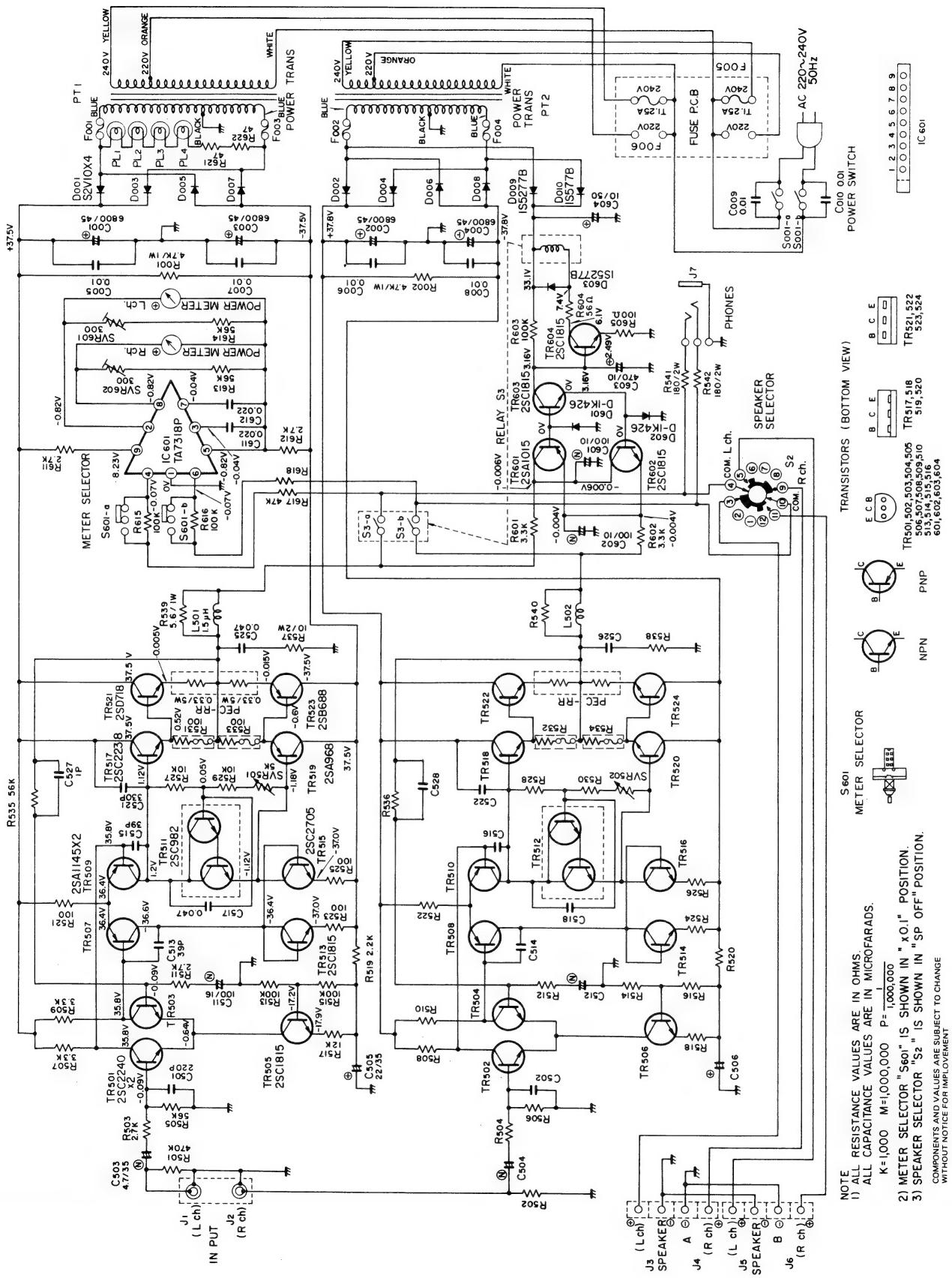
4. PRINTED CIRCUIT BOARDS BOTTOM VIEW



BOTTOM VIEW OF P.C.B AND WIRING



5. SCHEMATIC DIAGRAM



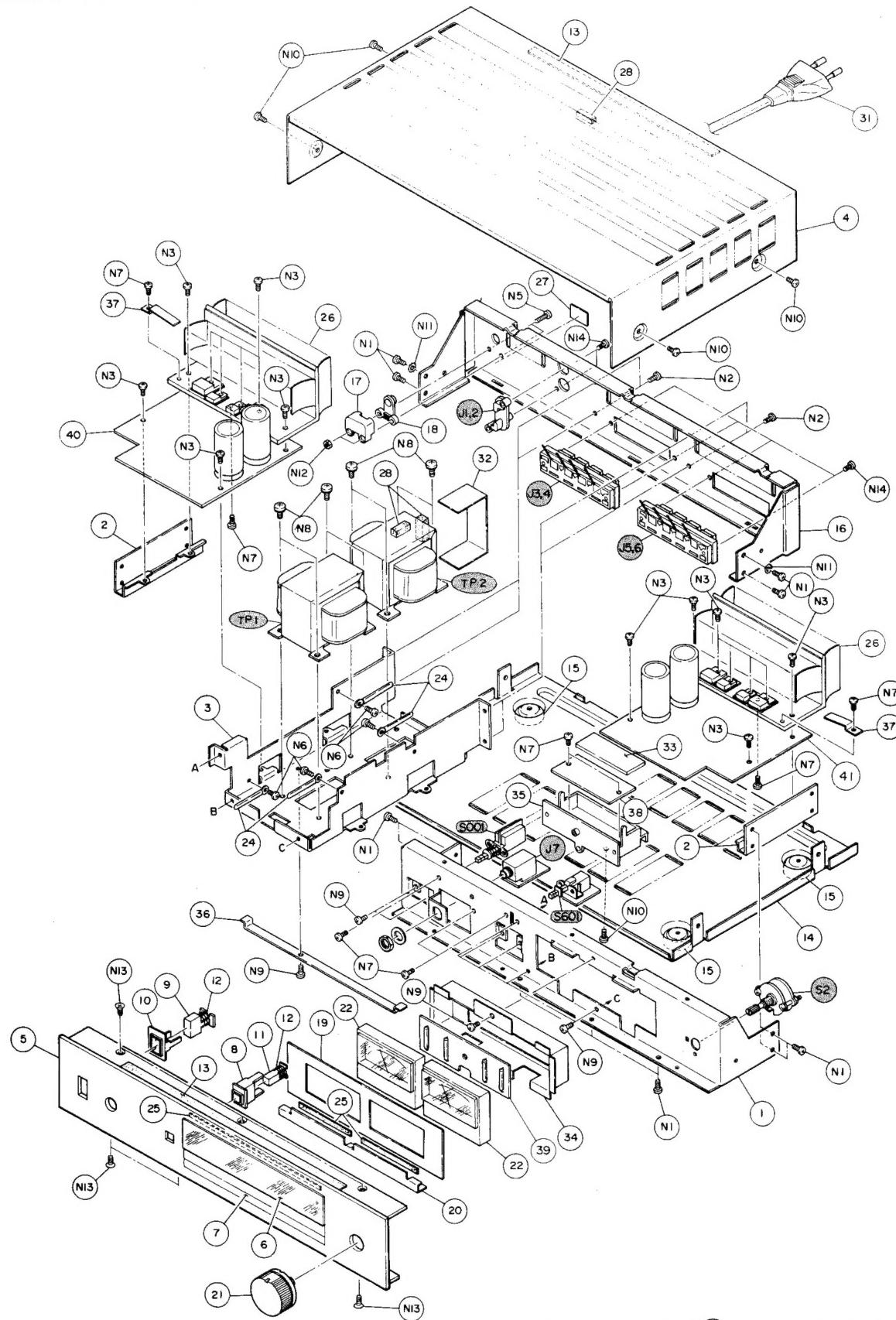
NOTE 1) ALL RESISTANCE VALUES ARE IN OHMS.
2) ALL CAPACITANCE VALUES ARE IN MICROFARADS.

(2) METER SELECTOR "S60" IS SHOWN IN "X0.1"

3) SPEAKER SELECTOR S2 IS SHOWN IN SP OF
COMPONENTS AND VALUES ARE SUBJECT TO CHANGE
WITHOUT NOTICE FOR IMPROVEMENT

6. EXPLODED VIEW AND PARTS LISTS

EXPLODED VIEW



The parts marked , see the electrical parts list.

PARTS LIST

ELECTRICAL PARTS

Symbol No.	Part No.	Description
IC		
IC601	40324050	IC, TA7318P
TRANSISTORS & DIODES		
TR501	36325846	Transistor, 36325864-BL1
TR502	36325846	Transistor, 36325864-BL1
TR503	36325846	Transistor, 36325864-BL1
TR504	36325846	Transistor, 36325864-BL1
or		
TR501	36325847	Transistor, 36325847-BL2
TR502	36325847	Transistor, 36325847-BL2
TR503	36325847	Transistor, 36325847-BL2
TR504	36325847	Transistor, 36325847-BL2
or		
TR501	36325848	Transistor, 36325848-BL3
TR502	36325848	Transistor, 36325848-BL3
TR503	36325848	Transistor, 36325848-BL3
TR504	36325848	Transistor, 36325848-BL3
TR505	36317480	Transistor, 2SC1815-BL
TR506	36317480	Transistor, 2SC1815-BL
TR507	36540510	Transistor, 2SA1145-0
TR508	36540510	Transistor, 2SA1145-0
TR509	36540510	Transistor, 2SA1145-0
TR510	36540510	Transistor, 2SA1145-0
or		
TR507	36540520	Transistor, 2SA1145-Y
TR508	36540520	Transistor, 2SA1145-Y
TR509	36540520	Transistor, 2SA1145-Y
TR510	36540520	Transistor, 2SA1145-Y
TR511	36753140	Transistor, 2SC982TM
TR512	36753140	Transistor, 2SC982TM
TR513	36317480	Transistor, 2SC1815-BL
TR514	36317480	Transistor, 2SC1815-BL
TR515	36334810	Transistor, 2SC2705-0
TR516	36334810	Transistor, 2SC2705-0
or		
TR515	36334820	Transistor, 2SC2705-Y
TR516	36334820	Transistor, 2SC2705-Y
TR517	36325616	Transistor, 2SC2238-0
TR518	36325616	Transistor, 2SC2238-0
TR519	36533416	Transistor, 2SA968-0
TR520	36533416	Transistor, 2SA968-0
TR521	36845859	Transistor, 2SD718-0
TR522	36845859	Transistor, 2SD718-0
TR523	36625360	Transistor, 2SB688-0
TR524	36625360	Transistor, 2SB688-0
or		
TR517	36325620	Transistor, 2SC2238-Y
TR518	36325620	Transistor, 2SC2238-Y
TR519	36533425	Transistor, 2SA968-Y
TR520	36533425	Transistor, 2SA968-Y
TR521	36845836	Transistor, 2SD718-R

Symbol No.	Part No.	Description	
TR522	36845836	Transistor, 2SD718-R	
TR523	36625336	Transistor, 2SB688-R	
TR524	36625336	Transistor, 2SB688-R	
TR601	3653404A	Transistor, 2SA1015-Y or	
	36534060	Transistor, 2SA1015-GR	
TR602	36317480	Transistor, 2SC1815-BL	
TR603	36317480	Transistor, 2SC1815-BL	
TR604	36317480	Transistor, 2SC1815-BL	
D001	22115564	Diode, S2V10-X	
D002	22115564	Diode, S2V10-X	
D003	22115564	Diode, S2V10-X	
D004	22115564	Diode, S2V10-X	
D005	22115564	Diode, S2V10-X	
D006	22115564	Diode, S2V10-X	
D007	22115564	Diode, S2V10-X	
D008	22115564	Diode, S2V10-X	
D009	37978380	Diode, 1S5277B	
D010	37978380	Diode, 1S5277B	
D601	22115415	Diode, 1K426A	
D602	22115415	Diode, 1K426A	
D603	37978380	Diode, 1S5277B	
CAPACITORS			
Tolerance: D: $\pm 0.5\text{PF}$, J: $\pm 5\%$, K: $\pm 10\%$, M: $\pm 20\%$, P: +100 to -0%, Z: +80 to -20%, G: $\pm 2\%$			
(N): Nonpolarity type			
C001	22440324	Electrolytic	6800 mfd/45WV
C002	22440324	Electrolytic	6800 mfd/45WV
C003	22440324	Electrolytic	6800 mfd/45WV
C004	22440324	Electrolytic	6800 mfd/45WV
C005	22342103	Ceramic	0.01 mfd, Z
C006	22342103	Ceramic	0.01 mfd, Z
C007	22342103	Ceramic	0.01 mfd, Z
C008	22342103	Ceramic	0.01 mfd, Z
C009	22303024	Oil-Filled	0.01 mfd/450WV
C010	22303024	Oil-Filled	0.01 mfd/450WV
C501	22361221	Ceramic	220 PF, J
C502	22361221	Ceramic	220 PF, J
C503	22403080	Electrolytic	4.7 mfd/35WV(N)
C504	22403080	Electrolytic	4.7 mfd/35WV(N)
C505	22447220	Electrolytic	22 mfd/35WV
C506	22447220	Electrolytic	22 mfd/35WV
C511	22403082	Electrolytic	100 mfd/16WV(N)
C512	22403082	Electrolytic	100 mfd/16WV(N)
C513	22361390	Ceramic	39 PF, J
C514	22361390	Ceramic	39 PF, J
C515	22361390	Ceramic	39 PF, J
C516	22361390	Ceramic	39 PF, J
C517	22342473	Ceramic	0.047 mfd, Z
C518	22342473	Ceramic	0.047 mfd, Z
C521	22361331	Ceramic	330 PF, J

Symbol No.	Part No.	Description		
C522	22361331	Ceramic	330 PF, J	
C525	22342473	Ceramic	0.047 mfd, Z	
C526	22342473	Ceramic	0.047 mfd, Z	
C527	22361309	Ceramic	1 PF, D	
C528	22361309	Ceramic	1 PF, D	
C601	22403082	Electrolytic	100 mfd/16WV(N)	
C602	22403082	Electrolytic	100 mfd/16WV(N)	
C603	22443471	Electrolytic	470 mfd/10WV	
C604	22440351	Electrolytic	10 mfd/50WV	
C611	22371223	Mylar	0.022 mfd, J	
C612	22371223	Mylar	0.022 mfd, J	

RESISTORS

All fixed resistors are $\frac{1}{4}W$, $\pm 5\%$, carbon resistor unless otherwise noted.

Tolerance: G: $\pm 2\%$, J: $\pm 5\%$, K: $\pm 10\%$

R001	22573472	Metal Oxide	4.7K ohm, 2W
R002	22573472	Metal Oxide	4.7K ohm, 2W
R501	22545474	470K ohm	
R502	22545474	470K ohm	
R503	22545272	2.7K ohm	
R504	22545272	2.7K ohm	
R505	22545563	56K ohm	
R506	22545563	56K ohm	
R507	22545332	3.3K ohm	
R508	22545332	3.3K ohm	
R509	22545332	3.3K ohm,	
R510	22545332	3.3K ohm	
R511	22570519	Metal Oxide	2.7K ohm, $\frac{1}{4}W$, G
R512	22570519	Metal Oxide	2.7K ohm, $\frac{1}{4}W$, G
R513	22545104	100K ohm	
R514	22545104	100K ohm	
R515	22545104	100K ohm	
R516	22545104	100K ohm	
R517	22545123	12K ohm	
R518	22545123	12K ohm	
R519	22545222	2.2K ohm	
R520	22545222	2.2K ohm	
R521	22545101	100 ohm	
R522	22545101	100 ohm	
R523	22545101	100 ohm	
R524	22545101	100 ohm	
R525	22545101	100 ohm	
R526	22545101	100 ohm	
R527	22545103	10K ohm	
R528	22545103	10K ohm	
R529	22545103	10K ohm	
R530	22545103	10K ohm	
R531	22500233	Fusible	100 ohm, $\frac{1}{4}W$, J
R532	22500233	Fusible	100 ohm, $\frac{1}{4}W$, J
R533	22500233	Fusible	100 ohm, $\frac{1}{4}W$, J
R534	22500233	Fusible	100 ohm, $\frac{1}{4}W$, J

Symbol No.	Part No.	Description	
R535	22570538	Metal Oxide	56K ohm, $\frac{1}{4}W$, G
R536	22570538	Metal Oxide	56K ohm, $\frac{1}{4}W$, G
R537	22573100	Metal Oxide	10 ohm, 2W
R538	22573100	Metal Oxide	10 ohm, 2W
R539	22571569	Metal Oxide	5.6 ohm, 1W
R540	22571569	Metal Oxide	5.6 ohm, 1W
R541	22573181	Metal Oxide	180 ohm, 2W
R542	22573181	Metal Oxide	180 ohm, 2W
R601	22545332	3.3K ohm	
R602	22545332	3.3K ohm	
R603	22545104	100K ohm	
R604	22545560	56 ohm	
R605	22545101	100 ohm	
R611	22571272	Metal Oxide	2.7K ohm, 1W
R612	22571272	Metal Oxide	2.7K ohm, 1W
R613	22545560	56 ohm	
R614	22545560	56 ohm	
R615	22545104	100K ohm	
R616	22545104	100K ohm	
R617	22545473	47K ohm	
R618	22545473	47K ohm	
R621	22573470	Metal Oxide	47 ohm, 2W
R622	22573470	Metal Oxide	47 ohm, 2W
SVR501	22658471	Semi-Fixed	5K ohm
SVR502	22658471	Semi-Fixed	5K ohm
SVR601	22658515	Semi-Fixed	300 ohm
SVR602	22658515	Semi-Fixed	300 ohm
MISCELLANEOUS			
L501	22211228	Choke Coil, AF	
L502	22211228	Choke Coil, AF	
S001	22140518	Push Switch (Power)	
S601	22140612	Push Switch (Meter Selector)	
S2	22140611	Rotary Switch(Speaker Selector)	
S3	22148412	On the Relay	
PEC-RR	22135030	Multiple Component	
J1, J2	22163765	US2P Jack	
J3, J4	22161517	4P Terminal	
J5, J6	22161517	4P Terminal	
J7	22163746	Jack 6.5φ	
F001 ~ 004	22144263	Fuse 3.15A S	
F005, 006	22144213	Fuse 1.25A T	
	22165047	Fuse Holding Terminal	
PL1, ~ 4	22113472	Pilot Lamp 0.055A/12V	
PT1, 2	22223519	Power Transformer	
	22176550	Power Cord	
	22148412	Relay with S3	
	22104503	Power Meter	

EXPLODED VIEW PARTS

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
1	20015797	Chassis	N6	72633006	Bind Head Tapping 3.0 x 6mm
2	20735695	Bracket	N7	72633008	Bind Head Tapping 3.0 x 8mm
3	20735697	Power Transformer Bracket	N8	22701573	PAN Head 4.0x8mm with W/SW
4	20848603	Top Cover	N9	20795955	Bind Head 3.0x6mm with SW
5	20713843	Front Panel	N10	20795986	Bind Head 3.0x8mm with SW
6	20848602	Indicator Cover	N11	74022030	Lock Washer 3.0φ
7	20779929	Name Plate	N12	73653000	Nut 3.0
8	20743973	Button Guide	N13	70443006	Flat Head 3.0 x 6mm
9	20874668	Push Button	N14	22701724	Bind Head Tapping 3.0 x 10mm
10	20743974	Button Guide	ACCESSORIES		
11	20874667	Push Button		22164836	US1P Plug Cord
12	22772611	Spring		22953920	Owner's Manual
13	22756528	Cushion		22951862	Warranty Card
14	22832822	Bottom Cover			
15	20842649	Foot			
16	20015803	Back Chassis			
17	22754791	Cord Clamper			
18	22184183	Cord Clamper			
19	20754796	Indicator Plate			
20	20746993	Meter Support			
21	20872621	Selector Knob			
22	22104503	Level Meter			
23	22993614	Band			
24	22755516	Clamper Lug			
25	22756698	Cushion			
26	22748840	Radiator			
27	22906641	Voltage Label			
28	22756862	Cushion			
31	22176550	Power Cord			
32	22748854	Shield Plate			
33	22748855	Barrier			
34	22748844	Reflector			
35	20735696	Fuse Bracket			
36	20754794	Earth Joint			
37	20746920	Transistor Holder			
38	22193157	Fuse P.C. Board			
39	22193156	Pilot Lamp P.C. Board			
40	22193155	AF P.C. Board (Left)			
41	22193158	AF P.C. Board (Right)			
SCREWS AND RINGS					
N1	70433006	Bind Head 3.0 x 6mm			
N2	22701757	Bind Head 3.0 x 6mm			
N3	70433008	Bind Head 3.0 x 8mm			
N5	22701716	Bind Head 3.0 x 14mm			